

# *Machine and Tool* **BLUE BOOK**

ESTABLISHED 1906

**FEBRUARY 1951**

Special Report On  
CHUCKING MACHINES, TURRET LATHES,  
HAND SCREW MACHINES  
PART I

Dust Control in a Saw Manufacturing Plant  
Interesting Jigs and Fixtures  
Contents on Page 5

# Only **MARVEL** builds all four \*

\* HACK SAWING MACHINES

\* BAND SAWING MACHINES

\* BAND SAW BLADES

\* HACK SAW BLADES

While it is true there are several builders of hack sawing machines and many builders of band sawing machines, only MARVEL builds BOTH hack saws and band saws. The fact is that MARVEL manufactures 35 models of 10 basic types of metal sawing machines which include the world's fastest automatic production saw, the world's largest giant hydraulic hack saws, the world's most versatile band saw and the most widely used small shop saws.

With intimate and broad field experience in all types of metal cutting-off equipment and 35 different saws available, it is obvious that MARVEL Field Engineers occupy a unique and exclusive position in the industry. They are eminently qualified to make expert and unbiased recommendations covering the type, size and model of metal sawing equipment best suited to individual requirements—the most efficient, most accurate, fastest, broadest in scope and the most economical.

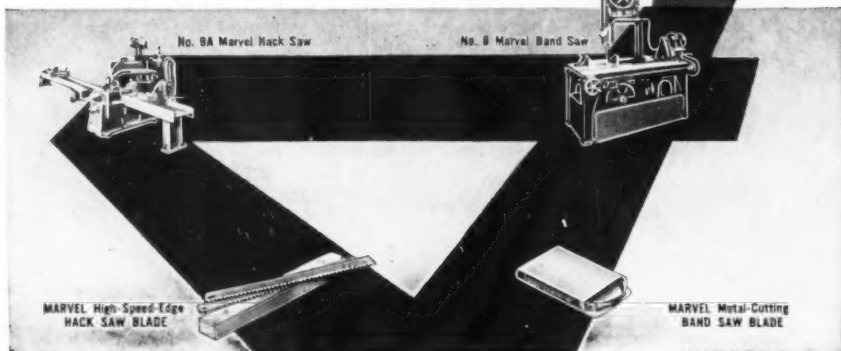
MARVEL is also the only manufacturer of both metal sawing machines and metal sawing blades. Because the efficiencies of both the machine and the blades are interdependent, each upon the capability of the other, expert knowledge covering both saws and saw blades is essential to the proper appraisal of any specific sawing situation. Correct balance of cutting speed and blade life, feed pressure and blade tension are all potent factors in over-all performance. Here again it is the MARVEL Field Engineer who is qualified to provide the comprehensive answer to your question. His job is to help you saw metal most efficiently—his services are available upon request—gratis.

Write for Catalog 49

**ARMSTRONG-BLUM MFG. CO.**

5700 Bloomingdale Ave., Chicago 39, U.S.A.

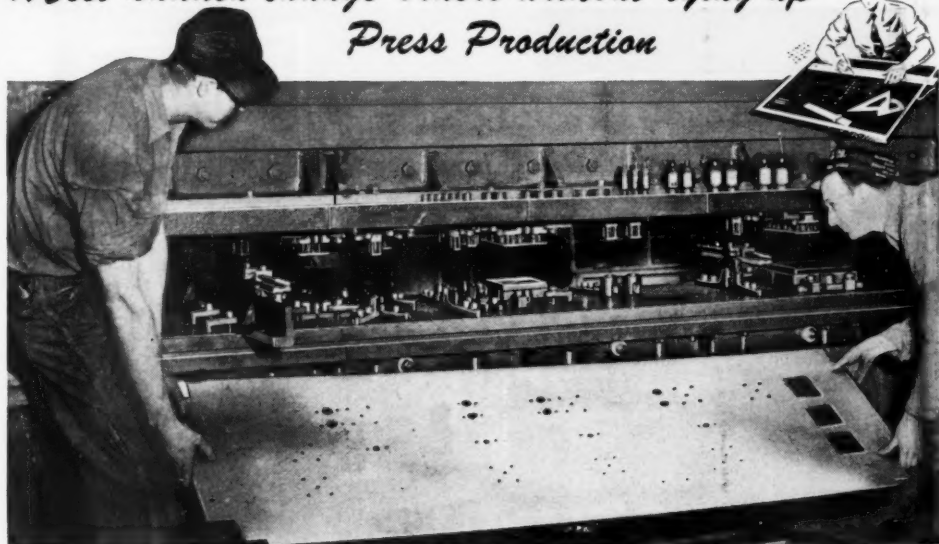
# 4



**MARVEL** *Metal Cutting*  
**SAWS**  
Better Machines—Better Blades



# Meet sudden change-orders without tying up Press Production



*Write*  
for the Whistler  
Catalog today and  
get all the facts.

Change-orders from the engineering department usually cause plenty of headaches in production...particularly where die piercing operations are involved.

But, if you're using Whistler Adjustable Dies, there is no lost time—no waiting—no extra die expense. The same dies are easy to rearrange to the new design. Add units from stock, or delete sizes and shapes no longer required. Arrange the new set-up right on the press.

Consider the savings in production time alone. Then think how continued re-use of the same dies in subsequent jobs writes off first cost.

Whistler Dies can be used in practically any press. All parts are interchangeable. Precision is assured on long or short runs. Closer centers permit fewer press operations.

Deliveries are quick...little or no waiting. Standard round punches and dies up to 3" are available from stock. Ovals, squares, rectangles and special shapes can be made up in a few days.

## S. B. WHISTLER & SONS, INC.

760 Military Road • Buffalo 17, N. Y.

# Wade®

No. 7

## HAND SCREW MACHINE

... for modern, fast, economical production of second-operation work. All rotating parts are "Dynerically" balanced for vibrationless operation at all speeds. Quick-acting collet closer allows swift and almost effortless chucking and removal of work.

7" swing Spindle speeds, 315 to 1300 RPM

1" collet with superior characteristics

4-to-1 Hi-Lo Speeds at finger tips

Spindle stops without stopping motor



Send for Catalog

THE WADE TOOL CO., 51 River St., Waltham, Mass.

**HARDINGE**  
ELMIRA, N.Y.

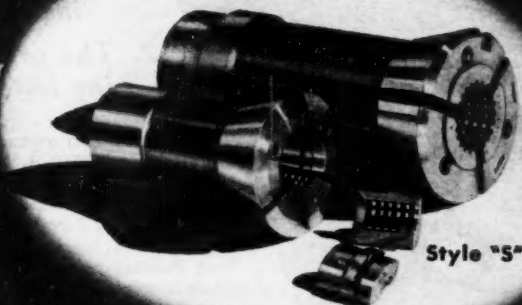
## MASTERS AND PADS

BETTER PERFORMANCE and BETTER PRODUCTION

**HARDINGE STYLE "S" SURE-GRIP  
DRAW-IN MASTER COLLETS and PADS**

for  
CLEVELAND  
CONE  
GREENLEE  
GRIDLEY and ACME-GRIDLEY  
NATIONAL ACME  
NEW BRITAIN

Available for all sizes  
of above machines  
up to and including  
3½" capacity.



**Style "S"**

**HARDINGE STYLE "B"  
MASTER FEED FINGERS and PADS**

for  
BROWN & SHARPE  
CLEVELAND  
CONE  
DAVENPORT  
GREENLEE  
GRIDLEY and ACME-GRIDLEY  
NATIONAL ACME  
NEW BRITAIN

Available for all sizes  
of above machines up to  
and including 3½" capacity.



**Style "B"**

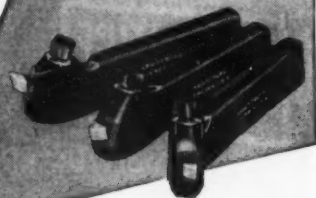
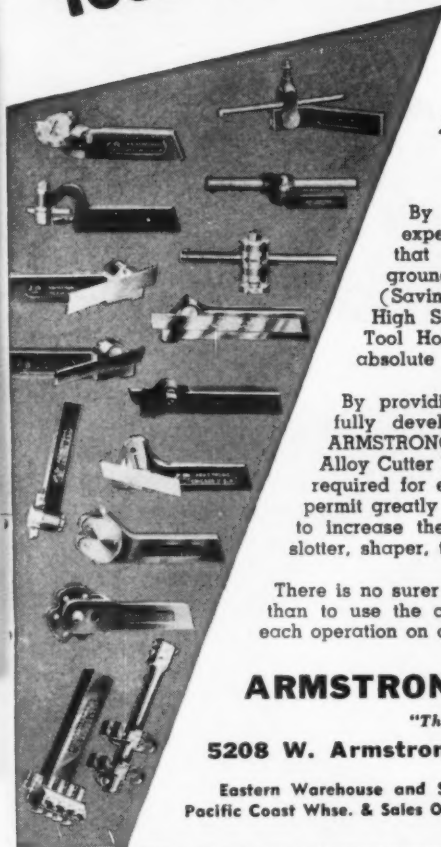
Ask for Style "S" and Style "B" Bulletins which give all  
performance features, price savings, and ordering information.

**HARDINGE BROTHERS, INC., ELMIRA, N. Y.**

PERFORMANCE HAS ESTABLISHED LEADERSHIP FOR HARDINGE



# ARMSTRONG TOOL HOLDERS



answer both . . .

1. The problem of lowering costs
2. The problem of increasing output

By providing permanent, multi-purpose, inexpensive ARMSTRONG TOOL HOLDERS that use cutters or bits that are quickly ground from standard high speed shapes (Saving: All Forging, 70% Grinding and 90% High Speed Steel), the Armstrong System of Tool Holders will reduce your tool cost to an absolute minimum.

By providing stronger, more efficient tools, carefully developed for each operation, as well as ARMSTRONG High Speed Steel, ARMALLOY Cast Alloy Cutter Bits or Armide Carbide-Tipped Cutters as required for each job, ARMSTRONG TOOL HOLDERS permit greatly increased speeds and feeds, enable you to increase the hourly output of every lathe, planer, slotter, shaper, turret lathe and screw machine.

There is no surer way to lower costs and increase output, than to use the correct ARMSTRONG TOOL HOLDER for each operation on all machines.

## ARMSTRONG BROS. TOOL CO.

*"The Tool Holder People"*

5208 W. Armstrong Ave. Chicago 30, U.S.A.

Eastern Warehouse and Sales: 199 Lafayette St., N. Y. 12, N. Y.  
Pacific Coast Whse. & Sales Office: 1275 Mission St., San Francisco 3, Calif.



# Blue Book

## Contents

published monthly • vol. 47 no. 2

### February 1951

**Special Report on Chucking Machines, Turret Lathes, Hand Screw Machines, Part I.**

#### LEADING ARTICLES

Featured in this Issue .....	95
As the Editor Sees It .....	97
How's Business? .....	99
Difficult Clevis Job Milled 3 Times Faster with Inserted Carbides .....	105

by Jack Hunter

**Special Report on Chucking Machines, Turret Lathes, Hand Screw Machines, Part I .....**

1. Thoughts on the Efficient Use of Checking Machines .....	108
by William F. Schleicher	
2. Descriptions of Late Model Chucking Machines, Turret Lathes, and Hand Screw Machines .....	126
3. Specifications of American-built Machines .....	134

**Letter from Great Britain .....**

by Robert Hutcheson

**Effective Dust Control in Saw Manufacturing .....**

by S. H. Fain

**Interesting Jigs and Fixtures Developed by  
Western Manufacturers .....**

by Frank Charity

**Get More Production from Job Methods  
Training (Foremanship Forum) .....**

by Ed Mottershead

#### PLUS THESE REGULAR FEATURES

<b>Shop Hints .....</b>	<b>183</b>
Boring Fixture for a Machine Detail .....	183
Kink in Engine Lathe Operation .....	188
Automatic Punch .....	190
Pointers on Buying Shafting and Bearings .....	190
How to Select Centerdrill .....	194
Turret Lathe Becomes Casting Machine .....	196
<b>Modern Tools in Action .....</b>	<b>201</b>
Precision Turning Cuts Costs .....	201
Waste Heat Recovery Leads to Large Savings .....	202
Electronic Equipment Speeds Machining of Blades for Jet Engines .....	204
Screw Machine Attachments .....	204
Plastic Pulley Cuts Machining Costs .....	206
<b>News in the Industry .....</b>	<b>211</b>
Positions Open and Men Available .....	229
Available Literature .....	247
New Books .....	257
What's New in Metalworking .....	265
Mechanics Through the Ages .....	336
Products Index .....	356
Index to Advertisers .....	362

Hitchcock District Managers are Listed on Page 285.

accepted under section 34.64, P. L. & R.  
authorized office • Chicago, Illinois

COPYRIGHTED 1951 BY THE HITCHCOCK PUBLISHING CO. • 222 E. Willow Ave.  
WHEATON, ILLINOIS

**CCA**

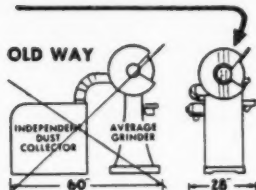
February, 1951

5



## "BUILT-IN" FEATURE

SAVE OVER 50%  
FLOOR SPACE THE  
HAMMOND WAY



*Hammond*  
of KALAMAZOO

## NO-DUST GRINDER

- Requires only 6½ square feet.
- Protects employees' health.
- Protects nearby machine tools against excessive wear from dust and grit.

A self-contained Grinder and Dust Collector for 10", 12" and 14" wheels. Write for Bulletin No. 104.



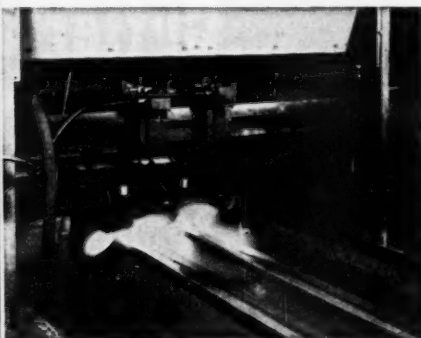
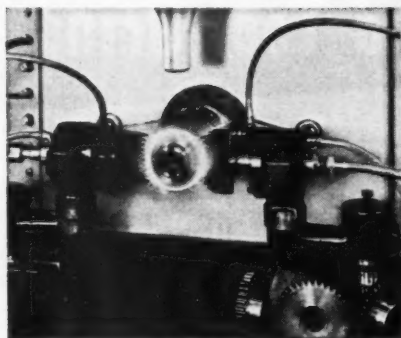
*Hammond*  
*Machinery Builders*  
INC

1614 DOUGLAS AVENUE

KALAMAZOO 54, MICHIGAN



# flame facts



Flame hardened gears throughout are standard . . . flame hardened bed ways are available at small extra cost . . . in Tray-Top light duty all geared head engine and toolroom lathes. Add these plus values to **versatility**: 12 spindle speeds, 48 thread and feed changes, top speeds to 1800 rpm., quickest changeover from English to metric thread chasing . . . **operator convenience**: centralized controls, instant speed selection with direct reading color-match speed selector, dual control levers, "Tray-Tops" on headstock and tailstock for parking tools, mikes, gages, etc. . . **operator safety**: totally enclosed change gear box, totally enclosed electrical panel, accessible only by opening master disconnect switch, feed levers disengaged in down position . . . **floor space savings**: cabinet legs really have room for chucks, face plates, etc., reduce or eliminate need for separate bench or storage space . . . Add up all Tray-Top's outstanding values and you'll find it your best buy. Swing sizes: 10", 12½", 15", 18". Write for new bulletin.

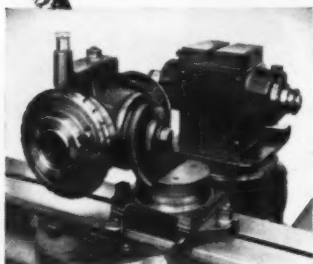
## cincinnati lathe & tool co.

CINCINNATI 9, OHIO, U.S.A.

# Your Cincinnati No. 2 Cutter and Tool Grinder

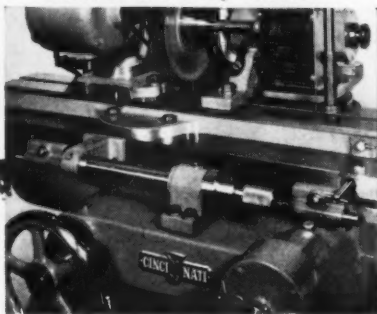
## *TAKES ON MORE RESPONSIBILITY* WITH LARGER FAMILY OF ATTACHMENTS

A big family makes "Pop" work steadily, and a lot of attachments have the same effect on machine tools. The attachments illustrated here are recent additions to the "standard" line for CINCINNATI No. 2 Cutter and Tool Grinders. Most shops could use some of them to advantage. And when you see how useful they are, perhaps you will find that you need another CINCINNATI Cutter Grinder in your shop to take over some of the work now being handled at a higher cost by other methods. Look into these possibilities today. Catalog M-1618-3 contains machine specifications.



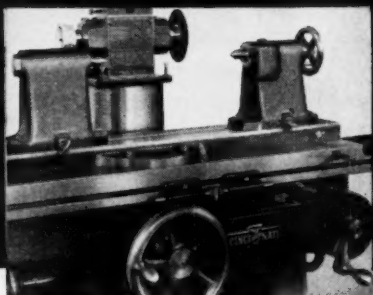
**Workhead Indexing Attachment.** Offers an optional method, preferred in some shops, of grinding straight fluted cutters and end teeth on end mills and co-bore cutters. For salvaging straight tooth cutters.

### THE CINCINNATI MILLING MACHINE CO. CINCINNATI 9, OHIO

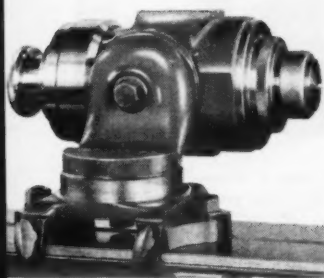


**Micrometer Table Positioning Attachment.** Has 8" adjustment, dial graduated in thousandths. Does not restrict use of machine for conventional cutter sharpening operations. For grinding accurate steps on blade drills and counterbores; for grinding grooves and "lands" on hydraulic valves.

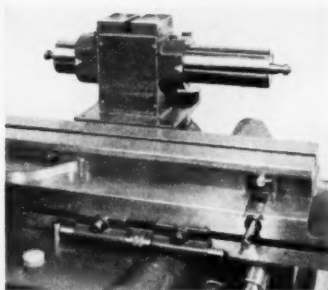




**Heavy Duty Tailstocks.** For grinding heavy, large diameter cutters. Maximum swing, 16".



**Draw-in Collect Attachment.** For grinding small cutters of the "Weldon" type.



**Extended Grinding Wheel Spindle.** For surface grinding and sharpening broach inserts.

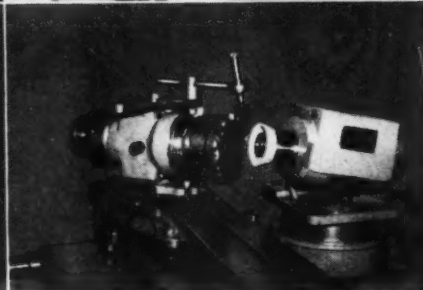
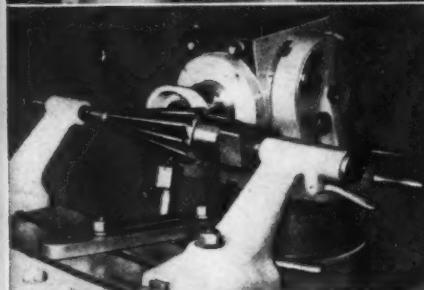
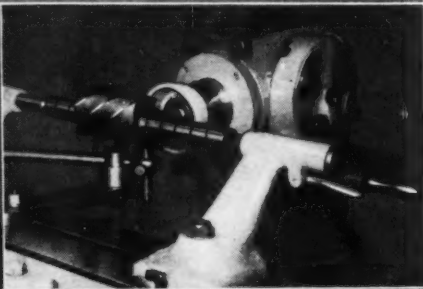
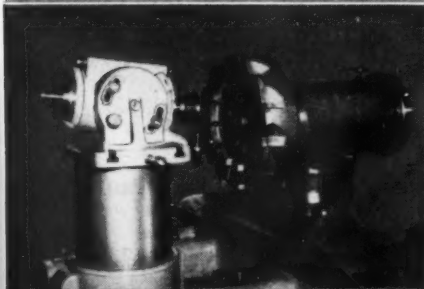


**Dust Exhaust System.** For isolated CINCINNATI No. 2 Cutter Grinders, and for groups requiring individual dust collecting units because of frequent changes in shop layout.

# NEW

with new adjustment

## This POPE Motorized Tool and Cutter Grinder SPINDLE



Here's one you've always wanted — a totally enclosed, sealed lubrication, super precision 1 HP, 3600 RPM motorized tool and cutter grinding head, mounted on a new bracket that provides angular adjustment in a vertical plane.

POPE Spindles have the radial and axial rigidity to make wheels cut faster — spark out

quicker. Grinding time is reduced. Softer wheels can be used for cooler grinding and for producing the kind of cutting edge that stands up.

Make the most of your present grinders. Equip them with this new and better POPE Spindle.

Ask us to quote price and delivery.

**SPECIFY THIS POPE SPINDLE ON YOUR NEXT TOOL AND CUTTER GRINDER**

No. 71

# POPE

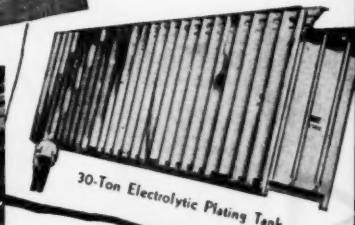
TRADE MARK REG. U.S. PAT. OFF.

**POPE MACHINERY CORPORATION**

ESTABLISHED 1920

261 RIVER STREET • HAVERHILL, MASSACHUSETTS  
BUILDERS OF PRECISION SPINDLES

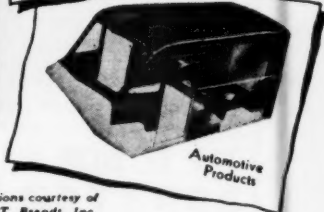
# DO IT ON A VERSATILE Cincinnati Press Brake



30-Ton Electrolytic Plating Tank



Control House for Steel Mill

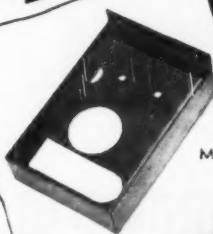


Automotive Products

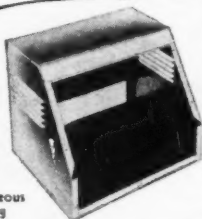
Illustrations courtesy of  
Charles T. Brandt, Inc.



Roll Tables for Steel Mill



Miscellaneous  
Forming



The press brake capacity of Charles T. Brandt, Inc., adequately takes care of the job, whether large or small—in jobbing or production quantities.

In a highly competitive field, the powerful and versatile Cincinnati Press Brakes are profitable performers. They not only meet competition—they set the pace.

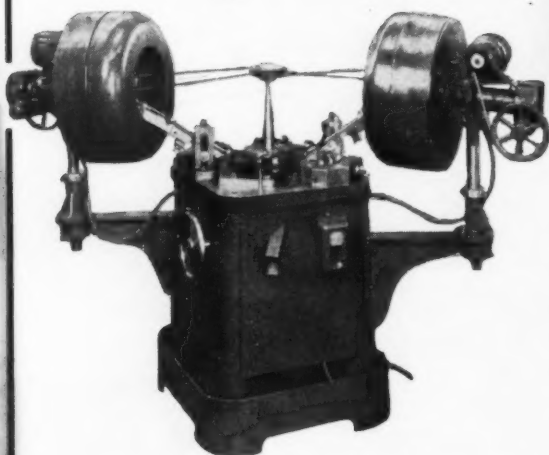
Write for catalog B-2A, describing operations, features, and special arrangements including wide beds and rams, bed and ram extensions, deeper gaps, higher die space and other features.

## THE CINCINNATI SHAPER CO.

CINCINNATI 25, OHIO, U.S.A.  
SHAPERS • SHEARS • BRAKES



# The Rollmaster



**FOR ACCURATE  
THREAD ROLLING**

Another PRUTTON advanced Model Automatic Machine designed for accurate thread rolling, which meets the enormous planned production schedules necessary in industry today (better than 25,000 pieces per hour).

Rotary in design, THE PRUTTON ROLL MASTER can be easily operated by unskilled workmen.

*Write today for full particulars.*

**TAP IT WITH A  
PRUTTON**

## Tapmaster

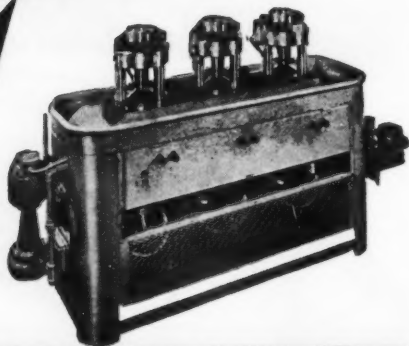
**3 TAPPING MACHINES IN 1**

The Tapmaster Line handles a complete range of work up to 4".

Production figures vary from 500 to 1500, depending on the type of work to be tapped.

Also available for heavy duty work is the No. 40 Tapmaster. This machine is designed for collapsible tap work up to 4".

*Write today for descriptive bulletin.*

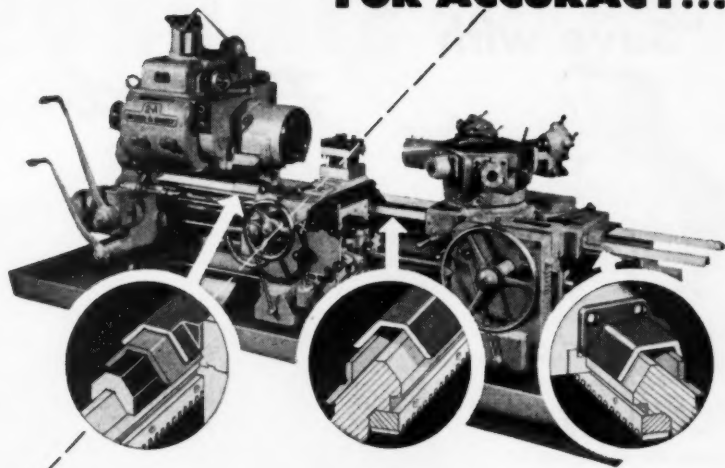


**D. H. PRUTTON MACHINE & TOOL CO.**

5295 W. 130th St.

CLEVELAND 11, OHIO

## FOR ACCURACY...



### • There is no substitute for VEE-WAYS

**N**EW MACHINE ACCURACY is maintained for many extra years of service because of a basic design which is a distinctive feature of all Warner & Swasey Saddle Type Turret Lathes. VEE-WAYS of high test nickel iron are cast integral with the DIAGONAL RIBBED, one piece bed. Induction hardened by an exclusive process for greatest wear resistance, the VEE-WAYS are then ground to smoothness and precision. The most heavily loaded saddle slides over the ways with an ease which makes hand wheel control almost effortless for the operator.

The VEE-shape distributes weight and pressure of saddle and loaded turret to make carriage self-aligning.

The heaviest roughing cuts and the finest finishing cuts are taken without necessity of adjustment . . . without possibility of weaving.

Patented Telescoping Way Covers (see illustration above) completely protect the VEE bed from scratches from chips or damage from dropped tools, etc.

Equally important, the Way Covers prevent the floods of coolant from washing away the film of lubricant carried to the Ways by automatic lubrication.

VEE-WAYS are only one of many valuable features of Warner & Swasey construction, but they are a fundamental principle which makes Warner & Swasey so easy to operate, and so outstandingly efficient in preserving extreme precision under long years of hardest service.

Your Warner & Swasey Field Representative can explain *all* the features of Warner & Swasey Machine Tools which make them so advantageous for low-cost production.

**WARNER & SWASEY SELLS ONE THING  
... INCREASED PRODUCTION**



TURRET LATHES, MULTIPLE & SINGLE SPINDLE AUTOMATICS, PRECISION TAPPING AND THREADING MACHINES

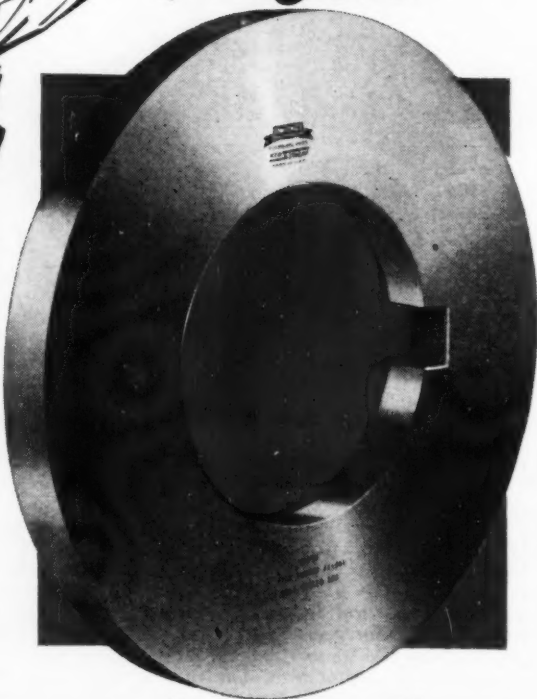
# "Save with **SIMONDS**" *Forged*



## **Rotary Shear Knives**

So says anyone who slits any type of sheet or strip metal. For they *know* that these "Red Streak" Knives cut straighter, cleaner, and *longer between sharpenings* ... because they're forged and micro-finish ground. Forging condenses the grain structure — prevents nicking. Micro-finish grinding permits non-ferrous metal slitting without "pick-up."

Designed for specific shearing applications, these long-lived knives are made from 3 types of steel forged in Simonds' own mills ... High Chrome, Special Alloy and High Speed. Send for free "Shear Selector" chart or ask for a "Simonds Man" to help with your slitting problems.



## **...and Squaring Shears**



Cross-section showing "Tungsweld"  
High Speed Steel inlaid cutting edge.

**SIMONDS**  
SAW AND STEEL CO.  
PITTSBURGH, MASS.

This "Tungsweld" Squaring Shear far outlasts other types ... causes less down-time... gives far faster, cleaner shearing of tin plate, silicon, monel, stainless and other thin sheet metals ... all because of Simonds' special method of welding a high-speed steel inlay to tough steel backing. Order a set today made to your exact specifications and "Save with Simonds."

BRANCH OFFICES IN: Boston, Chicago, San Francisco and Portland, Ore. Canadian Factory in Montreal, Que.

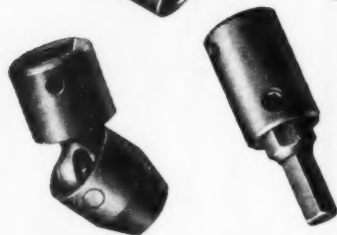
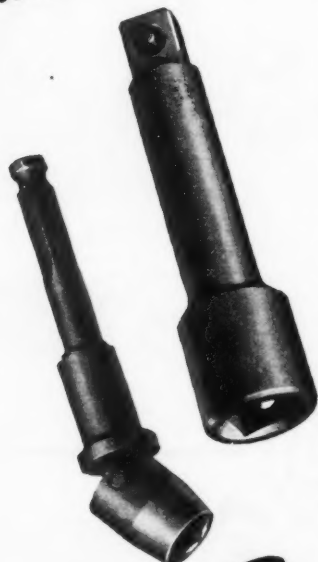


*"down time" costs more today!*

that's why you'll save more

by using

**APEX  
TOOLS**



**APEX  
TOOLS**

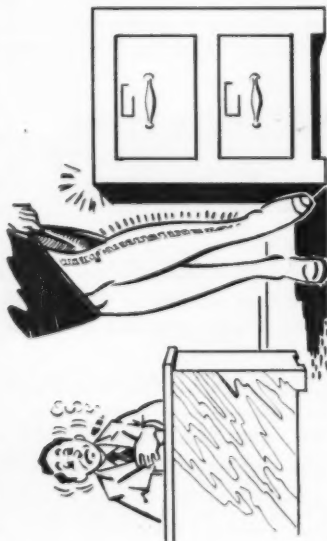
**CATALOG 19** lists styles, dimensions, type and size of drives. Write, on your company letterhead please, for your copy.

sockets, extensions, adapters

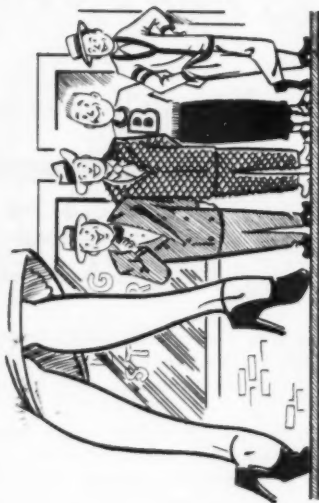
**THE APEX MACHINE & TOOL COMPANY**

1028 S. Patterson Blvd. • Dayton 2, Ohio

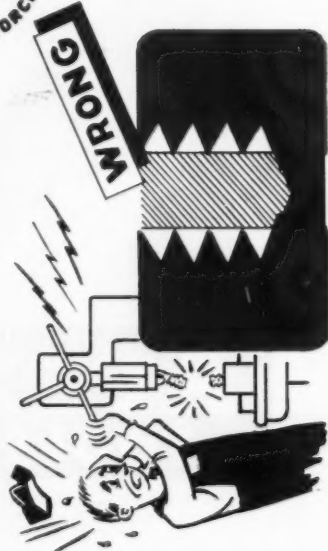
Safety Friction Tapping Chucks • Vertical Float Tapping Chucks • Self-Releasing and Adjustable Stud Setters  
Power Bits for Phillips, Frearson, Slotted Head, Clutch Head, Hex Head and Socket Screws • Hand Drivers  
for Phillips, Frearson and Clutch Head Screws • Aircraft and Industrial Universal Joints • Sockets and Universal  
Joint Socket Wrenches.



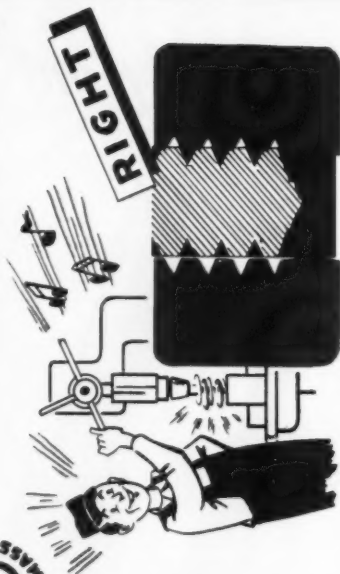
The way some gals stretch their hose is most shocking.  
One tap — the threads weaken and ruin the stocking.



But just the right load cuts the strain to a trifle —  
The threads'll be strong and we'll ALL get an eye-full!

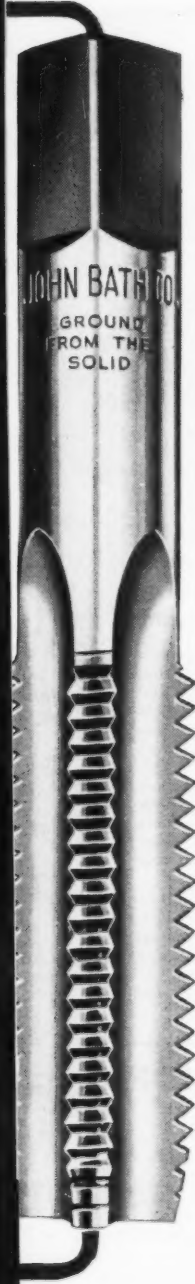


Like tapping one hundred per cent full thread —  
Much strain — no gain — the tap breaks instead!



If you'll tap to a normal seventy-five,  
Your threads'll be strong . . . your tap'll survive!





## **INSIST ON BATH TAPS . . . PROFIT BY THEIR PLUS-PERFORMANCE**

When holes are drilled smaller than practical, taps work with great difficulty and there is danger of loading or breakage. Under such a condition the tap cuts on the root and is said to be cutting 100% of thread. While there are cases where 100% depth of thread is necessary, generally around 75% is practical, econom-

ical and allows an ample safety margin.

Bath Taps are "ground from the solid" and are made in many styles for threading many different metals. Available in standard stock sizes or custom built for special jobs. Let a BATH representative help with your threading problems . . . or write us!

**PLUG AND RING THREAD GAGES • GROUND THREAD TAPS • INTERNAL MICROMETERS**

**JOHN BATH CO. INCORPORATED**  
**14 Grafton St., Worcester, Mass.**

# **STEEL CHIPS 2" WIDE** **3/16" THICK**

**hogged off with  
Davis "Clamped-on"  
H.S.S. Cutters**



These Davis cutters and holders are designed especially for heavy-duty frog and switch planing operations.



Two Davis holders accommodate all of the cutters necessary for frog, switch and guard rail planing operations.



## **DAVIS BORING TOOL DIVISION**

**GIDDINGS & LEWIS MACHINE TOOL CO.  
FOND DU LAC, WISCONSIN**

### **Sturdy Cutters and Holders Reduce Floor-to-Floor Time to 18 Minutes in Producing Two Rail Components for Track Switch**

Job-engineered Davis cutting tools easily meet heavy-duty machining demands of frog, switch and guard rail work. A typical example of tools in use is shown in this planing operation. Metal from two 100-lb. steel rails is hogged off in ribbons 3/16" thick and 2" wide in a single pass of the planer. The sturdy Davis "Clamped-On" type H.S.S. cutters and massive holders make it practical and common to use this machine feed.

Depend upon Davis cutting tools to remove metal faster and more accurately in all types of railroad machining. Before tooling new machines or retooling present machines, ask experienced Davis engineers for recommendations.

CASTINGS CLEANED IN ½ THE TIME  
ROTOR TOOLS **"PAID OFF"** IN 6 MONTHS!



● This foundry's production was slipping. Air lines were old—air pressure low. Scale and water in the lines caused high maintenance of air tools. Use of heavy chippers was also causing inspection rejects.

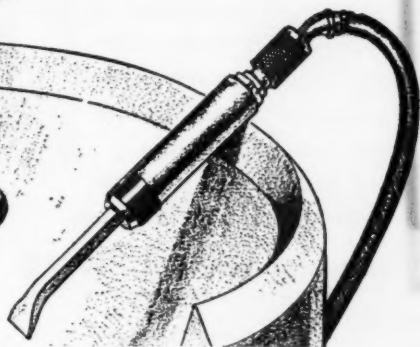
The Rotor Tool Application Engineer recommended that they replace all air grinders with Rotor 360 Cycle Grinders and replace heavy chippers with Rotor Scalars weighing only 3 pounds.

Now production time has been cut in half. These production savings "paid off" the complete high cycle installation in *six months*. The Rotor Scalars cut down inspection rejects and "paid off" in three weeks.

Want to study your methods for similar benefits?

Call in the Rotor Application Engineer or write for Catalogs #34 and #37.

**360 CYCLE O'TOOL**



AIR

THE **ROTOR TOOL** CO.

CLEVELAND, OHIO

HIGH  
CYCLE

# AIR-LIFT LIGHTENS LOAD

for LAUNDRY WORKERS...

**NOPAK...**

***Air Cylinder Reduces Fatigue,  
Speeds Production, Cuts Costs!***

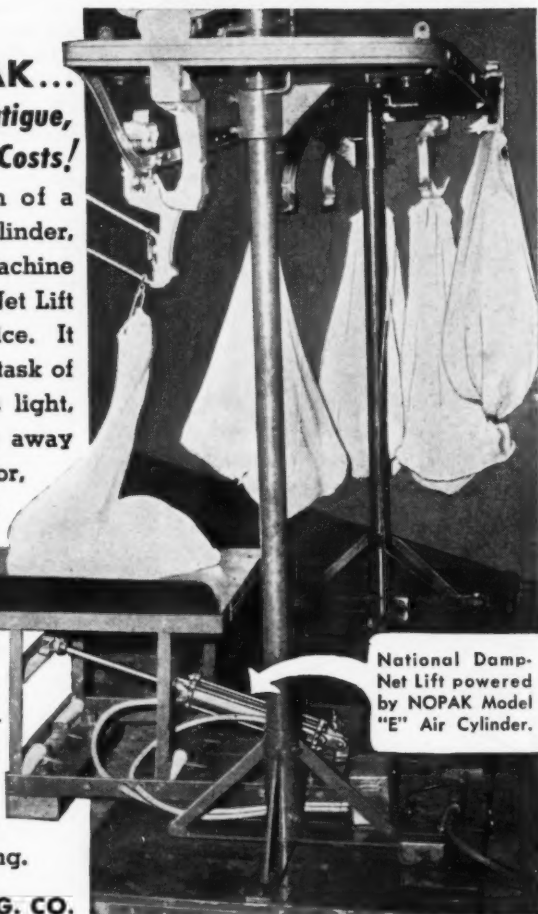
By proper application of a NOPAK Model E Air Cylinder, the National Marking Machine Co. has made its Damp Net Lift a real labor-saving device. It makes the former heavy task of handling damp bundles light, quick and simple; does away with "back-breaking" labor, speeds up work, reduces shakeout costs.

The proper application of NOPAK Valves and Cylinders can improve the performance of equipment that you build or use . . . for production, maintenance, or material handling.

**GALLAND-HENNING MFG. CO.**  
2754 S. 31st St., Milwaukee 46, Wis.

Write for Bulletin SW-1 or refer to  
Sweet's File for Product Designers.

Representatives in Principal Cities



National Damp-  
Net Lift powered  
by NOPAK Model  
"E" Air Cylinder.

**NOPAK**  
**VALVES AND CYLINDERS**  
DESIGNED for AIR and HYDRAULIC SERVICE



# How to put your plant ...IN THE PINK

Weed out old-fashioned cutting fluids and replace with CIMCOOL®—the revolutionary cutting fluid that covers 85% of all metal cutting operations.

This different cutting fluid replaces all water emulsions and all but a few highly compounded specialty oils. And Cimcool does a *better* job.

The root of Cimcool's difference is this—it's a *chemical emulsion* that combines friction reduction and cooling capacity in a degree never before attained.

So, no wonder the list of plants using Cimcool is growing larger every week. For Cimcool increases tool life, and there's less down time. It's longer lasting in machines, too . . . and reduces the cost of cleaning and changing. And Cimcool permits faster speeds. One test run will convince you!

Write for free booklet, "CIMCOOL Gives the Answers." Address, Sales Manager CIMCOOL Division, The Cincinnati Milling Machine Company, Cincinnati 9, Ohio.

®Trade Mark Reg. U. S. Pat. Off.


**A Production-Proved  
Product of**  
THE CINCINNATI MILLING  
MACHINE CO.



*for*

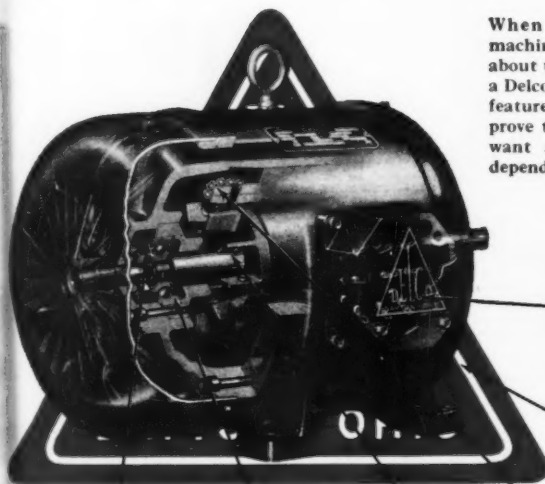
**85%**

OF ALL METAL CUTTING JOBS

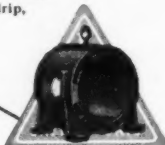


# Here's the "INSIDE STORY" on DELCO MOTORS

When you invest in new production machinery, it pays to be just as particular about the motor that drives it. Look inside a Delco Motor. You'll see extra engineering features, extra care in construction, that prove to you a Delco is built the way you want a motor built. Specify Delco for dependable power day in, day out.



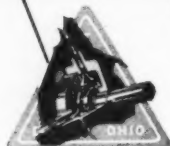
**WATER-TIGHT CONDUIT BOX**  
Protects against drip, splash



**CORROSIVE-RESISTANT CAST IRON FRAME**  
More solid, more rugged



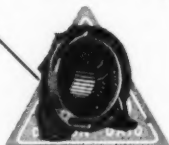
**POSITIONED BEARINGS**  
Maintain shaft alignment



**POSITIVE LUBRICATION**  
Lengthens bearing life



**DYNAMICALLY-BALANCED ROTOR AND SHAFT ASSEMBLY**  
Reduces vibration, wear



**DELCOTE COIL INSULATION**  
Over and above NEMA specifications

**"DELCO PREFERRED"**  
—because Delco Delivers

Open and enclosed motors for most industrial applications in sizes up to 100 horsepower for standard foot mountings. NEMA C & D flange-mounted motors available in sizes through 30 horsepower. Get in touch with Delco Products, Dayton, Ohio . . . or any sales office listed below.



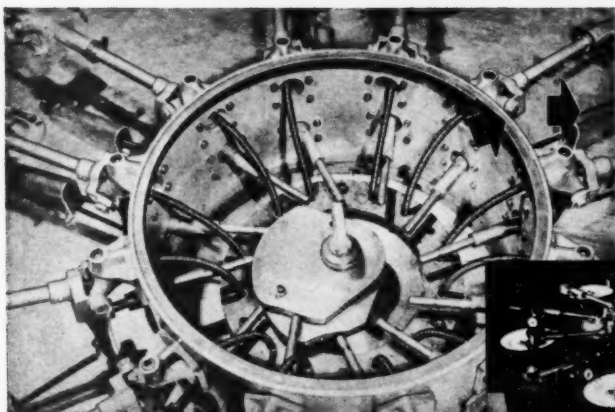
## DELCO MOTORS

**DELCO PRODUCTS**

Division of General Motors Corporation, Dayton, Ohio

**SALES OFFICES:** Chicago • Cincinnati • Cleveland • Dallas • Detroit • Hartford • Philadelphia • St. Louis  
ALSO AVAILABLE THROUGH UNITED MOTORS SERVICE BRANCHES





## **S.S.WHITE METAL MUSCLES®**

*Power the arms*  
**OF THIS MACHINE !**



Courtesy Rykman Machine Co., Hamilton, Ontario

The multi-armed machine above puts gold and silver borders on the rims of chinaware. In it, S.S.White flexible shafts drive each of the twelve arms. The big advantage of this setup is that the flexible shafts allow the arms to be moved up-and-down and in-and-out to accommodate different sizes and shapes of plates.

This is one of many applications in which S.S.White flexible shafts have met the need for a dependable, non-rigid drive. For details about these simple, adaptable mechanical elements,



### **WRITE FOR NEW BULLETIN 5008**

*It contains the latest information and data on flexible shafts and their application.*



**THE** *S.S.White* **INDUSTRIAL DIVISION**  
**DENTAL MFG. CO.**



Dept. H. 10 East 40th St.  
NEW YORK 16, N. Y.

IF-you are **PRODUCTION**  
 IF-you are **ECONOMY**  
 IF-you are **QUALITY**

mind  
 mind  
 mind

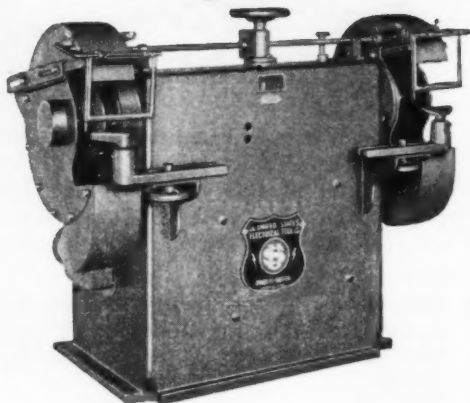


**Positively  
 LOWEST COST**  
*in time  
 and labor*

# UNITED STATES ELECTRICAL *Vari-Speed* SNAGGING GRINDERS

## Model 64 VS

One of the leaders in the remarkable family of snagging grinders which assures you



- constant peripheral speed on the grinding surface of the wheels throughout their life
- practically same cost as single speed grinders
- infinitely variable speeds
- adjustable wheel guards which govern wheel speed

available with one or two motors; for wheels up to 24 inches

## CONTACT YOUR JOBBER

. . . get full details **NOW**

**The UNITED STATES ELECTRICAL TOOL Co.**  
 CINCINNATI, OHIO



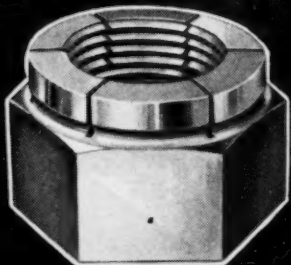
# Why

# FLEXLOC

## SELF-LOCKING NUTS

"This nut will take the place of the two regular nuts and the washer that is now on this piece"

(Part of a letter from a Connecticut distributor.)



## ... simplify assembly

You can readily see why FLEXLOCs simplify assembly when you read the above excerpt from our distributor's letter. From comments like this we feel sure there must be hundreds of similar cases where FLEXLOC Self-Locking Nuts can be used to advantage.

For FLEXLOCs offer these features: one-piece, all-metal construction—nothing to work loose or forget, no serious temperature problems; resilient, automatic lock-

ing sections, processed by our patented method to make possible FLEXLOCs' closely controlled torques; PLUS the fact that the most chattering vibration won't loosen FLEXLOCs, even after many applications.

Why not convince yourself with actual samples? Tell us what size you want and you'll receive them promptly, together with our latest literature.



FLEXLOC Self-Locking Nut, "regular" type.



FLEXLOC Self-Locking Nut, "thin" type.



FLEXLOC Self-Locking Nut, external wrenching type.

# -SPS

## STANDARD PRESSED STEEL CO.

JENKINTOWN 52, PENNSYLVANIA

## ASSORTED NEEDLE FILE SETS

5 1/2" and 6 1/4" overall

## ESCAPEMENT FILE SETS

X & XX 5 1/2" overall



Pat. Pend.

# MODERN

## new needle file case

GROBET, since 1812—the oldest name in files and the leader in its field is now bringing to you the most efficient clear plastic packaging for Precision Swiss Needle File Sets and Escapement File Sets **at no extra cost.**

Sold thru leading supply houses.

Send for Bulletin CK.

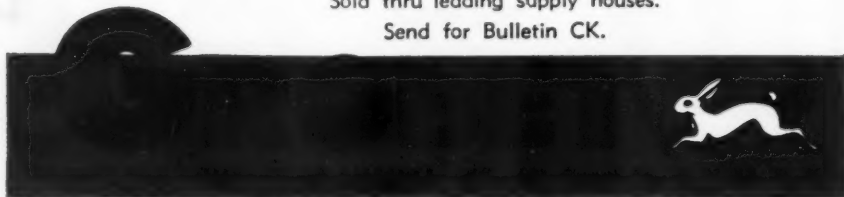
Kit Divides  
into Two  
Compartments

•  
Plastic Spring  
holds each  
File secure

•  
Files do not  
touch

•  
Fine Points  
protected

•  
Practical for  
bench use

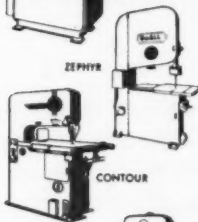


NEW YORK • CHICAGO • MONTREAL

# DoALL INDUSTRY'S NEW SET OF TOOLS



CONTOUR-MATIC



ZEPHYR

CONTOUR



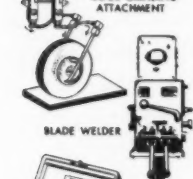
BAND FILE

TOOLROOM GRINDER



CRUSH GRINDER

"COOL GRINDING" ATTACHMENT

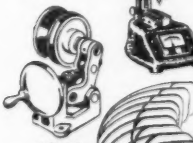


BLADE WELDER

GAGE BLOCKS

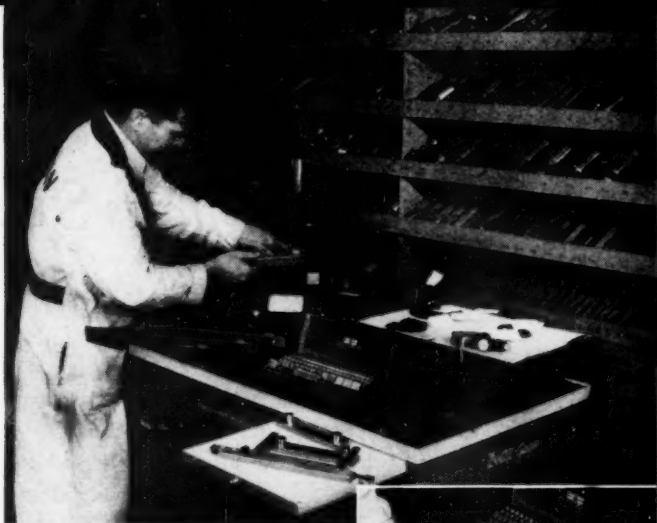


GAGE ACCESSORIES



VARIABLE SPEED DRIVES

SAW BANDS



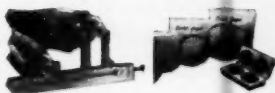
## IT'S IMPOSSIBLE to have GOOD INSPECTION without GAGE BLOCKS

Your Plug Gages, Ring Gages, Snap Gages, Dial Indicators, Comparators, Micrometers, and other shop measuring tools cannot measure accurately unless they are used with, and regularly checked against, a reliable set of Precision Gage Blocks.

The only way Gage Blocks are an expense is when you don't have them to use. Without them, you lose more than many times their cost in rejects, material and labor.

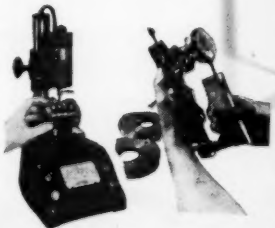
DoALL Gage Blocks and Accessories are the best in the world today. Our Gage Specialists can prove it to you. Write for proof today.

DoALL MOBILE INSPECTION UNIT contains a completely integrated set of Precision Inspection Tools.



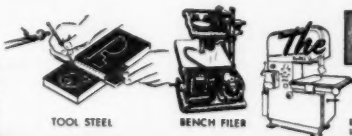
Gage Block Holders

Optical Flats



Comparators

Dial Indicators



TOOL STEEL

BENCH FILER

**The DoALL Company**  
Des Plaines, Ill., U.S.A.  
Cable Address: DoALL, Des Plaines  
DoALL Stores in Key Cities  
Factory Trained Representatives Everywhere

## Let's get the facts STRAIGHT

*about oil fog...oil mist...oil spray lubrication*

**W**idespread acceptance of the Norgren oil fog lubrication principle for air-powered equipment has brought many imitators, naturally.

Pride in our past achievements leads us to present the following facts, so that more of industry interested in better lubrication will get the facts *straight*.

Norgren pioneered in the development of the *oil fog principle* of lubrication *more than twenty years ago*. Being first in the field, Norgren naturally had to perform all of the fundamental research and basic experimentation which was necessary. The subsequent years of development have given Norgren an immense amount of enviable knowledge and experience about *oil fog lubrication*.

On high speed spindle lubrication, Norgren also took the lead. *Fourteen years ago*, we introduced the first Norgren oil fog lubricator into this highly specialized field—and many contributing

developments followed. At that time, spindle speeds of 15,000 r.p.m. were considered high. But with this Norgren aerosol lubricator sensational results in longer bearing life were produced. Thus, the Norgren spindle lubricator was directly and solely responsible for the development of present high spindle speeds of 100,000 r.p.m. and more. This Norgren *oil fog principle* is the most widely accepted method of high speed spindle lubrication today.

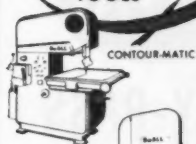
No . . . *oil fog* lubrication is *not new today*. It is almost as old as the Norgren organization itself. And in the twenty years since it was born in our engineering "lab," Norgren has always led the field in important developments of the *oil fog principle*. The latest evidence of this engineering leadership is our announcement of the *new and revolutionary Norgren Micro-Fog Lubricator*. Watch for it!

# Norgren

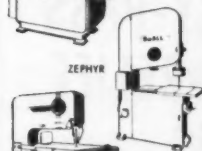
C. A. NORGREN CO.

222 SANTA FE DRIVE • DENVER 9, COLORADO

# DoALL INDUSTRY'S NEW SET OF TOOLS



CONTOUR-MATIC



ZEPHYR



CONTOUR



BAND FILER



TOOLROOM GRINDER



CRUSH GRINDER



"COOL GRINDING"  
ATTACHMENT



BLADE WELDER



GAUGE BLOCKS



GAUGE ACCESSORIES



VARIABLE  
SPEED  
DRIVES



SAW BANDS



42 HOURS SAVED over any other machining method.  
This 327 lb. High Tensile Iron Forming Die was band  
machined on the DoALL Contour-matic.

## BETTER THAN A MACHINE TOOL

The new DoALL Contour-matic is the first Band  
Machine that is a true production machine tool.

1. Has the rigidity of a machine tool.
2. Has a traveling work table.
3. Has centralized hydraulic controls.
4. Operates with minimum human effort.

AND it goes beyond a machine tool

1. Cuts every known material.
2. Has a wider range of tool speed.
3. Uses 27 kinds of cutting tools.
4. Saves time and material by cutting directly to a layout line.

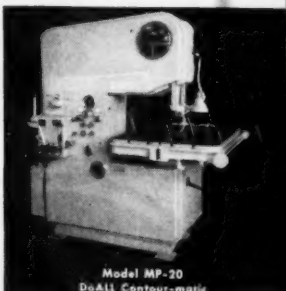
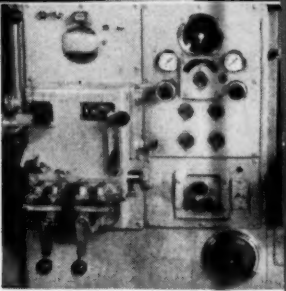
Write for a demonstration—  
See it work on your own jobs



TOOL STEEL



BENCH FILER



Model MP-20  
DoALL Contour-matic

**The DoALL Company**  
Des Plaines, Ill., U.S.A.  
Cable Address: DoALL Des Plaines  
DoALL Stores in Key Cities      Factory Trained  
Representatives Everywhere

**Another Giant Industry Uses**



**THE BALDWIN LOCOMOTIVE COMPANY**

is famous for its insistence on highest quality and efficiency in every detail.

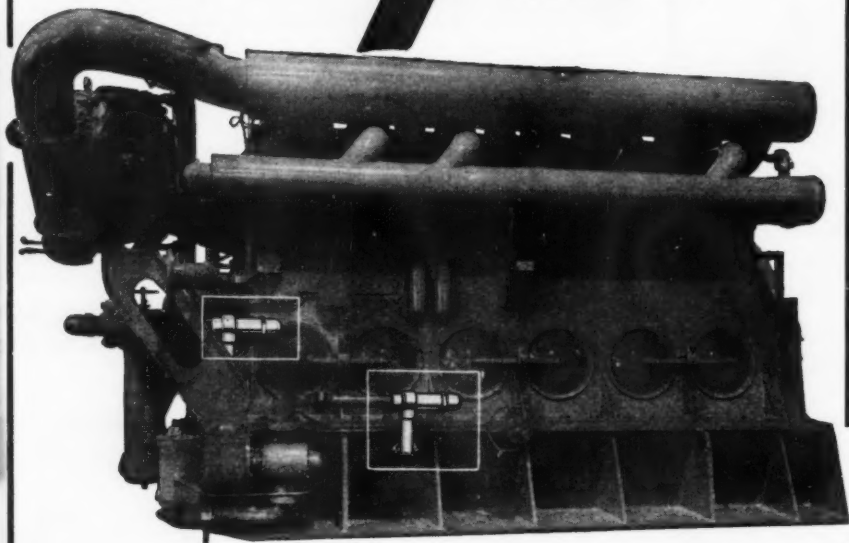
Two FULFLO OIL-RELIEF VALVES are applied to the lubricating oil piping system of the 1000 hp supercharged Diesel engine in Baldwin Diesel Electric Locomotives.

For constant, uniform pressures . . . NO MAINTENANCE . . . CHATTERLESS.

1/4" to 2" standard pipe thread and STD 300 lb. American flange valves 1" to 2".

**BY-PASS  
OIL-RELIEF  
VALVES**

*America's most  
successful valves*



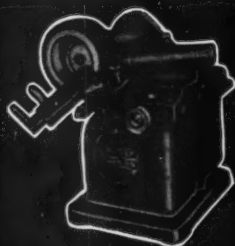
Write TODAY on your letterhead for  
**FULFLO MECHANICAL DATA BOOK**



**Specialties Co., Inc.**  
BLANCHESTER, OHIO



# MEET 1951 PRODUCTION SCHEDULES



**OLIVER  
OF  
ADRIAN**

*With*

## **OLIVER DRILL POINTERS**

In 1951 your tool room must be prepared for all-out production—equip it to meet any emergency! An installation of Oliver Drill Pointers will save time and money. Oliver Drill Pointers produce a theoretically perfect drillpoint that is always uniform—has equal lips—with the correct amount of clearance for the metal being drilled. Oliver ground drills last longer between grinds—they require less feeding pressure and horsepower to operate. Your drilling machines will produce more work and better work in less time. Savings will soon pay the initial cost of an installation.

**LET US PROVE IT**—Send us a few of your drills to sharpen—then check the results on your own production. No obligation, of course.

### **THE OLIVER DRILL POINTERS**

**No. 510** for drills  $\frac{1}{4}$ " to 3"—2-3-4 flute. Variable clearances. Variable point angles. Full automatic operation.

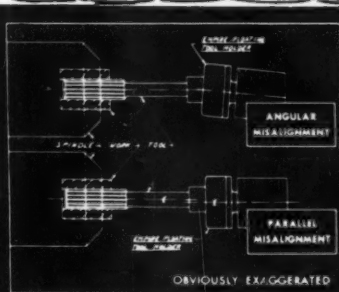
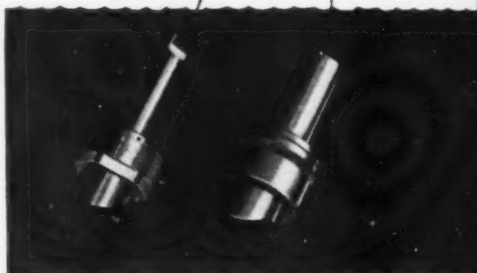
**No. 21 Oliver Bench Grinder.** Hand operated for Drills No. 57 to  $\frac{1}{2}$ ". Right hand, with an improved point. Attachments are available for grinding oil hole drills, left hand and other special points.

Write for literature that will save you dollars in your tool room.

## **OLIVER INSTRUMENT CO.**

**1408 E. MAUMEE • ADRIAN, MICHIGAN**

AUTOMATIC DRILL GRINDERS  
TOOL & CUTTER GRINDERS—DRILL  
POINT THINNERS—TEMPLATE  
TOOL GRINDERS—FACE MILL  
GRINDERS—DIEMAKING MACHINES



**EMPIRE FLOATING  
REAMER HOLDERS**  
*and* **EMPIRE FLOATING  
TAP HOLDERS**

And we do mean float!

These floating reamer and tap holders compensate for both out-of-parallel and angular misalignment and permit tap or reamer to float freely—in and out—and will not freeze under tension caused by drag.

By referring to the drawing you will note that the sleeve and shank float independently of each other—achieving a free and easy movement—a unique engineering design not found in any other floating tool.

With the Empire Floating Tool Holder you'll have no more bell mouths or over-sized holes. Holes can be reamed to close tolerances.

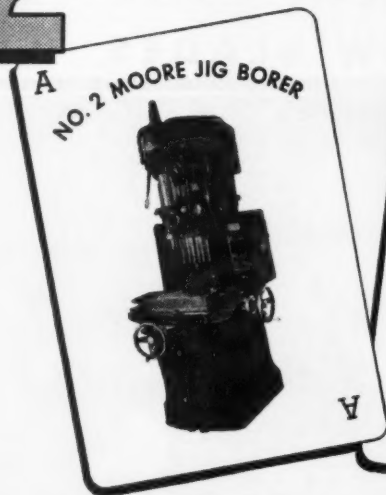
**Ask about the  
Floating-Releasing  
Tap Holder**

- that corrects for both parallel and angular misalignment
- that will not strip threads when tap is pulled out
- that permits adjustments of float to threading—right or left hand.

Send for folders giving full details

**EMPIRE**  
8774 GRINNELL AVE. **TOOL COMPANY** DETROIT 13, MICHIGAN

# 2 New Toolroom Aces



**Jig Borer of the Carbide Era** — For boring, drilling, reaming and spotting holes in dies, jigs and production parts, the speed and accuracy of the Moore Jig Borer cannot be equaled. More than 1,100 users of the No. 1 model will verify that. Now with this larger No. 2 model specially engineered for the Carbide Era, holes from .0135" (or smaller) up to 7" can be accurately located and produced in a fraction of the time required by other means. Hardened, ground and lapped lead screws, permitting table settings within .0001" by coordinate location, eliminate the need for end measures — reduce set-up time! Sensitive, centralized controls for spindle speeds and feeds, quick tool-changing and easy lubrication add up to more time and effort saved — more accurate work produced.

**Jig Grinder of the Fifties** — The originators of the Jig Grinder have done it again! With this completely new and larger Moore Jig Grinder, *regular and irregular contours* are ground to size and location after hardening. This extends the Jig Grinder's traditional function of relocating straight and tapered holes. The same quickly-set precision lead screws, as in the Moore Jig Borer, simplify the finish-grinding process. Holes from 1/64" to 8" can be relocated and ground within .0001" — by power or hand feed. The infinitely-variable spindle speeds, up and down feeds, and special stops and scales built into the machine, permit fast, accurate grinding of contours. Complete punches and dies can be ground to figures, with no stoning or fitting required for perfect alignment of mating parts.

In the Toolroom and on the Production Line, the Moore Jig Borer and Jig Grinder team up for speed and accuracy. Write for descriptive literature on both machines today. Moore Special Tool Company, Inc., 728 Union Avenue, Bridgeport 7, Connecticut.

## ADD TO YOUR TOOLROOM

JIG BORERS • JIG GRINDERS • PANTO-CRUSH WHEEL DRESSERS • DIE FLIPPERS • MOTORIZED CENTERS • HOLE LOCATION ACCESSORIES

# *Specify* ATLANTIC

## BAND SAW BLADES

*For*  
*Smoother*  
**CONTOUR CUTTING**



**A**TLANTIC SAWS meet all of your requirements for a superior blade on complicated die and fixture radius cutting. ATLANTIC specializes in accurate milled and precision set teeth, hardened to exact temper.



Atlantic's strong, practical box, plainly marked on sides and top. Remains in good condition until entire coil is used.

ATLANTIC'S special alloy steel insures longer wear and easier welding.

ATLANTIC'S one temper saw for all metals reduces stock you have to carry. Cut to length and welded, ready for use. Packed in strong Atlantic box. Write for new Atlantic Catalog.

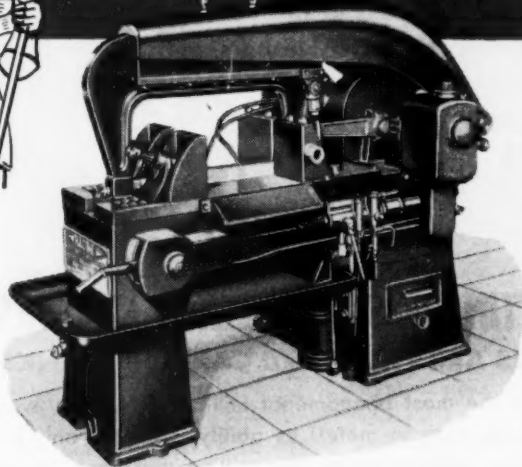
### *Atlantic Saw Mfg. Co.*

INCORPORATED

**Exclusively Manufacturers of Band Saw Blades**

**153 Brewery St., New Haven, Conn.**

## OUT OF THE PAST THEY HAUNT US TODAY



Old and obsolete machines, like ancient warriors, belong to a bygone day. Good in their time, these machines of the past hamper production, increase costs, help your competitor.

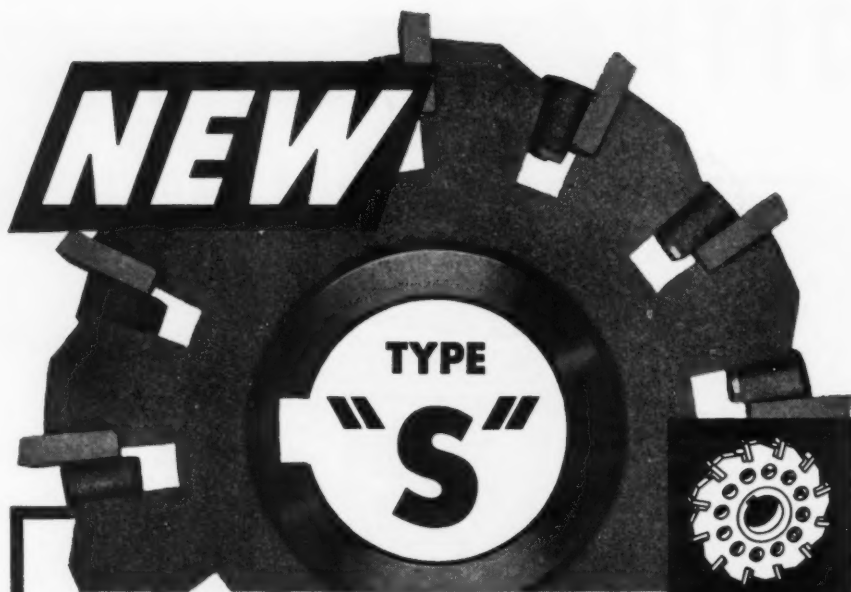
Startling facts reveal the gains you make with modern, late model RACINE Metal Cutting Machines. Designed for today — they cut costs for tomorrow. Give you clean, accurate work and economy in operation. Capacities 6" x 6" to 20" x 20". Single purpose and automatic bar feed production units.

We'll prove our point — without obligation to you — if you will write for FREE production estimates on your specific metal cutting jobs. Address Racine Tool & Machine Company, 1734 State Street, Racine, Wis.



# RACINE

STANDARD  
FOR QUALITY  
AND PRECISION



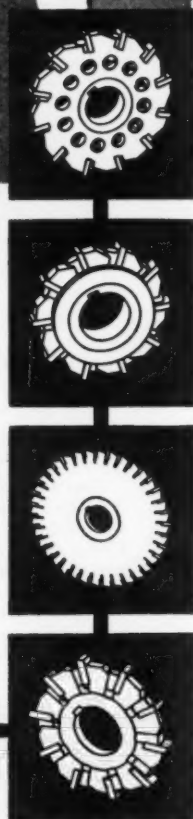
## **SLOTING & SIDE MILLING CUTTERS BLADES ARE STANDARD CARBIDE BLANKS**

Here's the most phenomenal milling cutter that ever touched its teeth to metal! Its ability is limited only by the stamina and power of your milling machines. More teeth per tool are available than any inserted-tooth milling cutter on the market. The blades are *standard carbide blanks* held with a simple taper wedge. The "S" is the most economical carbide cutter available — for blade replacement — for time-saving width and diameter adjustments — for minimum maintenance — for proven outstanding performance. Many stock sizes are available, and special cutters can be supplied for special needs.

*Write for  
Details!*

**Lovejoy**  
TOOL COMPANY, INC.

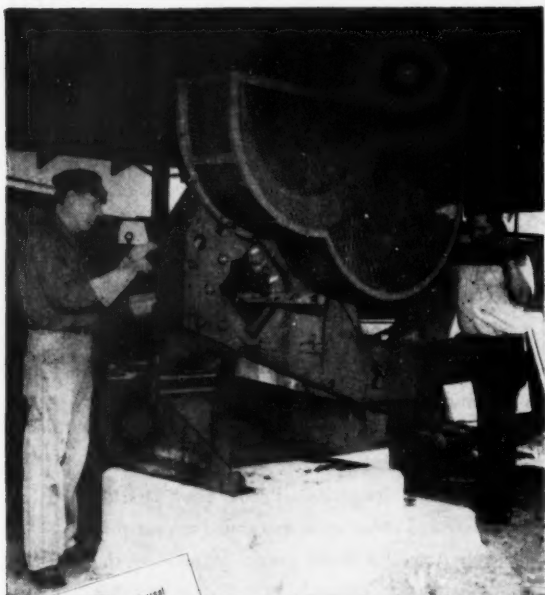
**136 MAIN ST., SPRINGFIELD, VERMONT**





# FLORIDA EAST COAST

*Railway*  
Keeps 'Em On Schedule



*"Buffalo"*

## UNIVERSAL IRON WORKER

*Helps Keep  
Maintenance  
On Schedule*

At left, the "Buffalo" U.I.W. in the St. Augustine Shops of Florida East Coast Railway is simultaneously cutting bar and notching angle. Here's a multi-purpose machine that turns out scores of fabricating jobs in a hurry.



**"One of the best labor-saving devices  
we ever purchased . . ."**

. . . that's the word of the Maintenance of Way Engineer of this progressive road. And users in steel mills, other heavy industries, give the same report. For here in one machine, you can punch, shear angles, cut bars, slit plates, notch and cope — and do it at full speed 24 hours a day. A U.I.W. will pay for itself in your shop in short order. WRITE FOR BULLETIN 322-0, for full details.

**BUFFALO *"Buffalo"* IRON WORKER COMPANY**

161 Mortimer St.

Buffalo, New York

Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

**DRILLING   PUNCHING   CUTTING   SHEARING   BENDING**

# AMES

**NO, NO BOYS! BE ACCURATE!**



**CHECK IT ON  
THE AMES**

A cost conscious restaurateur actually employs an Ames Thickness Measure to hold pie crust thickness to a uniform standard, thereby cutting down raw material waste, lowering fuel costs and assuring top quality pastry day in and day out. This unusual solution to a measuring problem is illustrative of the creative thinking of Ames engineering and design department. They'll tackle any measuring problem you may have and come up with a sound answer that will improve your quality control. Ames has built gauges to measure the thickness of potato chips, soap flakes, enamel on teeth, as well as gauges that check the sway of buildings, the stretch of bolts plus many others that solve successfully unusual and difficult applications. If you are puzzled and want an economical answer to a measuring problem, send it to B. C. Ames today.



Ames No. 1 Dial Comparator — measures objects up to 2" in cross section. Adjustable table with positive locking screw. Height 9½", weight 4 lbs., Dial Indicator graduated .001", with .250" range.

*Representatives in  
principal cities.*

**B. C. AMES CO.**

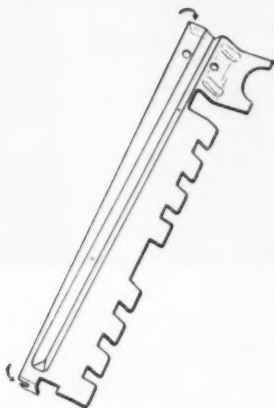
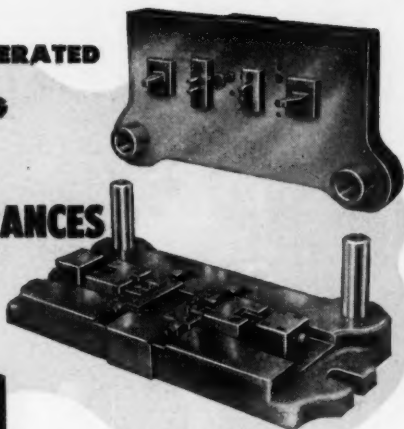
28 Ames Street  
Waltham 54, Mass.

Mfg. of Micrometer Dial Gauges • Micrometer Dial Indicators

**THIS  
CAM-OPERATED  
PIERCING  
DIE  
MAINTAINS STRICT TOLERANCES**

**WITH  
A**

**PRODUCTO  
DIE SET**



Call "Producto" in classified telephone directory in major stamping centers. Fast service thru 35 Producto Representatives.

When you're working with figures...as Monroe Calculating Machine Co. does...you can't tolerate even minor inaccuracies. That's why they selected PRODUCTO DIE SETS to keep their precision dies and punch presses in highly accurate relation to each other.

The cam-operated die pierces a fussy slot (.063 wide) in one end of various Selector Bails, and pierces a hole (.063) in the other end. (See arrows left.) Tolerances as close as  $\pm .001$  are maintained, with 50M to 75M pieces per grind.

When you order your PRODUCTO DIE SETS careful check-up will show precise alignment of guide pins and bushings, and closely held parallelism of punch and die holder...assurance of greater accuracy, longer die life...lower costs.

**THE PRODUCTO MACHINE COMPANY**  
960 HOUSATONIC AVENUE, BRIDGEPORT, CONNECTICUT, TEL. 4-9481

SP-100

February, 1951

39

# SKIL Drills speed generator



*Holes for mounting brackets on a Lindberg-Fisher Tilting Pot Furnace are drilled with a powerful Model 283 SKIL 1/2" Drill. Selected for its hard-driving performance, this SKIL Drill takes care of all holes that cannot be drilled or punched on stationary equipment.*



SKIL Saws



SKIL Sanders



SKIL Grinders



SKIL Sanders



SKIL Drills



SKIL Shear



SKIL Grinders

# assembly at Lindberg Engineering Company

## SKIL $\frac{1}{4}$ " and $\frac{1}{2}$ " Drills cut costs, save time on production lines...

Walk through the large Lindberg shops. You'll find real production efficiency . . . and you'll find fast-working SKIL Drills . . . in every department. See how easily they handle on every job and on every operation where electric drills are used. Like other leading manufacturers everywhere, Lindberg has relied on SKIL equipment for years.

Prove SKIL performance the sure way—try them in your plant on your toughest production or maintenance jobs! Ask your SKIL Tool Distributor to demonstrate SKIL Drills, Grinders, Sanders, Saws and other SKIL Tools today.

SKIL Products are made only by

**SKILSAW, INC.**

5033 Elston Ave.

Chicago 30, Ill.

Factory Branches in

Principal Cities

In Canada:

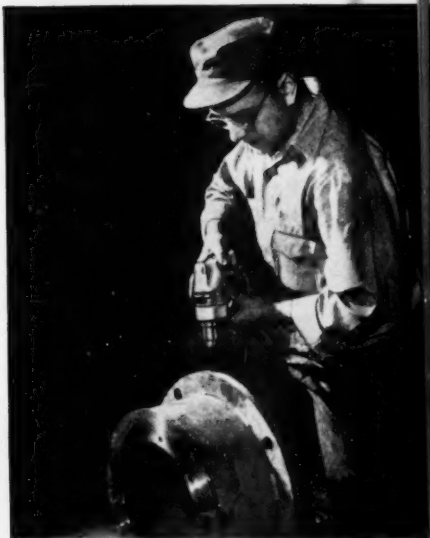
**SKILTOOLS, LTD.**

66 Portland St.

Toronto, Ont.



Model 825 SKIL Saw is used in the shipping department to saw lumber for a large export crate. Lindberg says, "SKIL Saws are used for work of this type to eliminate walking back and forth to the stationary saws, resulting in a great saving of time."



Holes for mounting water jacket covers on Lindberg HYEN Atmosphere Generators are drilled with a Model 45 SKIL  $\frac{1}{4}$ " Drill. Model 45 is a favorite with men and women workers for its compact, lightweight construction; easy grip; effortless handling and its fast drilling in tight spots.

# SKIL



**SKIL Grinders**

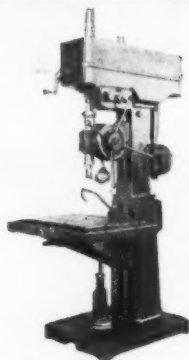


**SKIL Hammers**



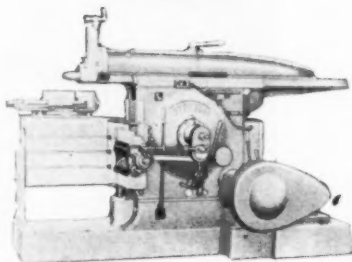
**SKIL Drivers**

# Western- THE FAMOUS LINE

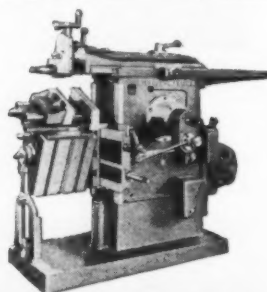


## ← ★ NEW

WESTERN No. 2-12 Upright Drill—Infinite spindle speeds — Sealed ball bearings throughout — 9 geared feeds — Alloy steel gearing — centralized controls — splined spindle—Back geared—1" drill capacity—12" Overhang — 24" Swing — Available with 1, 2, or 3 Heads — Rectangular or round column and table types — Write for Catalog B-4915.



STEPTOE SHAPERS—Vee type ram—Centralized controls — Fully Timken bearing equipped—Forced feed lubrication—Multiple disc clutch—Helical bull gear—Involute splined shafts—4 or 8 speeds—7 heavy duty sizes. America's oldest and best shaper. Write for catalog No. B4820.



## ← ★ NEW — FIRST IN AMERICA

STEPTOE-WESTERN HIGH SPEED SHAPERS Up to 200 Strokes per minute—4, 9, or 18 all-gear speeds — Vee Type Ram — Timken Bearings Throughout — Forced Feed Lubrication — Helical Bull Gear — Involute Splined Shafts — Universal Table — 10" Heavy Duty Vise — For Medium Duty at Lowest Cost — Available in 12" and 15" sizes. Write for Catalogs No. B4820-S and No. B5021.

# WESTERN MACHINE TOOL

COMPLETE LINE: RADIAL DRILLS • SHAPERS • AUTOMATIC



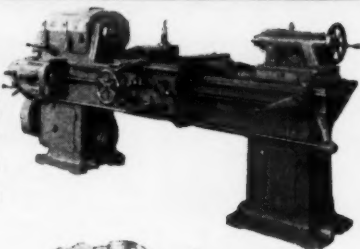
# OF PRODUCTION EQUIPMENT

THE BIG

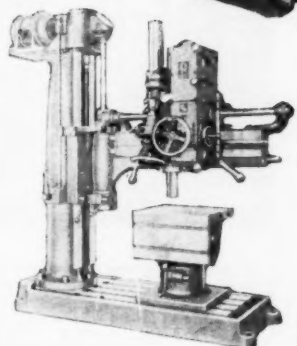
# 4

WESTERN

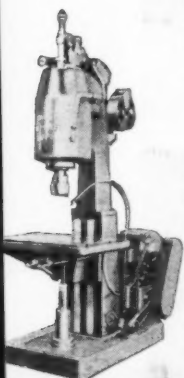
LINE

→ 


**CHARD LATHES** — Timken Bearing equipped — Geared multispeed or cone head—Precision hollow spindle — Centralized controls — Full line of accessories. Available in five sizes: 16", 18", 20", 24" & 28" swing over bed. Write for Catalog No. B4940.

→ 

**WESTERN HIGH SPEED RADIAL DRILLS**—for economical high production—"DOUBLE LOW-HUNG" spindle drive—12 speeds in head, 40—2000 R.P.M.—made in six sizes—Ball bearing throughout — Write for Catalog No. B4931.

 ←

**GARVIN AUTOMATIC "HI-POWER TAPPER"** Timken Bearing equipped—Capacity to 4" pipe tap—4 speeds through sliding gears — Precise depth, reverse, & torque control — Involute splined spindle. "Low Hung Drive" to spindle insures accurate holes — Write for Catalog B4712-H.P.

→ 

**GARVIN AUTOMATIC TAPPERS** — "Operator's responsibility ends at the starting lever"—Full range of sizes and multiple heads  $\frac{1}{8}$ " to  $1\frac{3}{4}$ " diameter taps — Timken bearing equipped — Adjustable torque — Precision depth and reverse control—Less tap breakage—Production estimates on request. Write for Catalog No. B4812-S—Specify sizes.

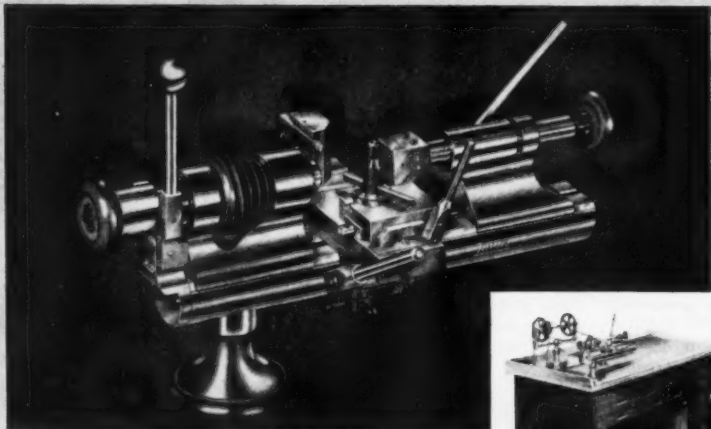
## WORKS

HOLLAND, MICHIGAN . . . . .

TAPPERS • UPRIGHT DRILLS • ENGINE LATHES

# HOLD A ROD .004" IN DIAMETER

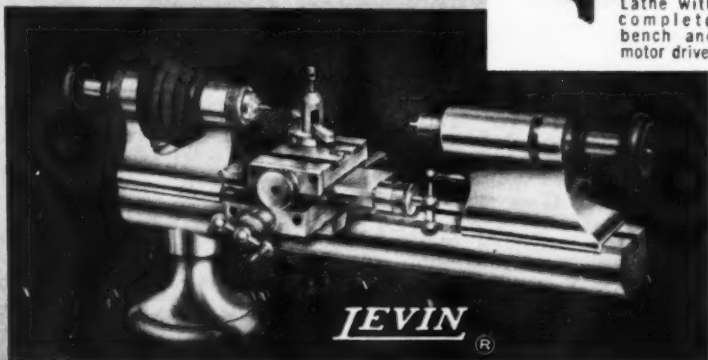
## WITH COMPLETE ACCURACY



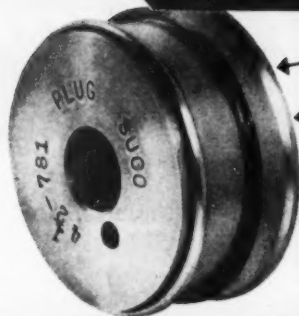
A LEVIN lathe makes delicate precision easy because it is designed for working with small parts. Collets from .004" to 5/16" are standard and kept in stock. Two sizes of lathes with maximum collet capacity either 3/16" or 5/16", swing 4", bed length 12". Full line of accessories for second operations, production, tool work and model making. Send for catalog.



Lathe with complete bench and motor drive.



LOUIS LEVIN & SON INC., 782 E. PICO BLVD., LOS ANGELES



- ← Sentry Hardened Tool Retains All Contours!
- ← Sentry Hardening Permits Maximum Hardness Through Soaking, Without Danger of Surface Oxidation!
- ← Sentry Hardening Eliminates Scale and Decarburization!
- ← Sentry Hardening Provides Materially Longer Tool Life!

**REASON**

**MAXIMUM  
HARDNESS!**

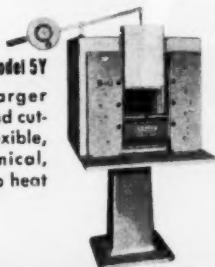
The methodical growth in the adaptation of the SENTRY DIAMOND BLOCK METHOD of heat treating high speed steel has been based on improved tools, practical economy and efficiency.

Prove for yourself what more than 100 leading firms already know . . . let SENTRY test-harden tools for you; then compare the results in actual tool performance!

**Sentry Model 2Y**  
For small tools, cutters of moly, tungsten and cobalt high speed steels. Ask for catalog D-1



**Sentry Model 5Y**  
For larger tools and cutters. Flexible, economical, quick to heat up.



**Sentry Model YP**  
Vertical model for long, slender drills, reamers, broaches, etc.



# ***NOW*** - Pressure Control

# ***New***



Up to 15-inch Ram Stroke  
BIG — but COMPACT  
Up to 50-Ton Work Pressure  
Dual Safety Controls  
Manual or Automatic  
24-inch Daylight  
31" x 19½" Work Table  
Independently Adjustable  
Pressing and Traverse Speed

# for those BIGGER Jobs!

## 50-TON MULTIPRESS

**Extra adjustability, accuracy and efficiency of oil-hydraulic MULTIPRESS  
now ready for hundreds of higher-tonnage needs**

Six thousand Multipresses in the one- to 35-ton range have already proved the advantages of their fast, smooth, controlled pressures and wide-range, fully adjustable ram action, on hundreds of different production operations.

*Now these same Multipress advantages can be applied to operations in the 50-ton range!*

And every production-boosting feature of the smaller models is retained in the 50-ton model.

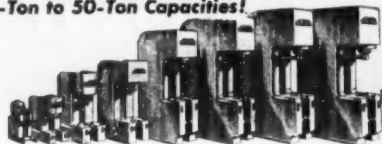
**Widely Adjustable Ram Action** The 50-ton Multipress offers a fully adjustable ram stroke up to 15 inches. Pressing and approach speeds are independently regulative, permitting rapid traverse in combination with controlled working speeds for greatest production.

The press ram can be set to return upon reaching either distance or pressure limits, preset according to the work being handled.

Time delay control and many other types of operating sequences are also available.

**Big Work Area** With a 24-inch daylight opening and a work table 31 inches wide by 19½ inches deep, the 50-ton Multipress provides plenty of room for large work, fixtures, and special tooling. Operating controls are at the operator's fingertips—safety engineered for your protection.

**8 MULTIPRESS Frame Sizes!  
1-Ton to 50-Ton Capacities!**



**Manual or Automatic Control** The press can be equipped for either manual or automatic ram control, with dual hand levers or dual push-buttons for safety, if desired. Nine control valves offer many different ram actions—from simple manual cycling to synchronized sequence operation. Vibratory repeat stroke operation, an exclusive Multipress feature, is also available.

**Indexing Tables and Accessories** Six- and twelve-station Multipress indexing tables, widely used for automatic feeding of parts to the press ram, are available for the 50-ton Multipress, in addition to a variety of other standard accessories for special types of operations. The press is also ideal for hydraulic interlocking of automatic feeding, loading, and ejection devices for almost any standard need.

**Compact, Versatile, Efficient** Panel-mounting of control valves and cylinder is a Multipress feature of major importance. It permits more compact design, increases efficiency, and reduces maintenance costs. Requiring minimum space, the press is easy to adapt to any production line, even in close quarters.

Write today for details on this new answer to faster, better, safer, lower-cost production!

**The DENISON Engineering Co.**

1184 Dublin Rd., Columbus 16, Ohio

**DENISON**  
*HydrOlics*

**INCREASES  
PRODUCTION...**

**LOWERS COSTS...**

**PAYS FOR ITSELF  
QUICKLY...**

The ROUSE HAND MILLER is a widely used, inexpensive, high speed, ball bearing, motor driven machine for handling light cuts in brass, aluminum, steel, plastics, and other materials—fast, accurately, and at very low cost. Only \$98.00\*.

Fixtures (illustrated) extra.

Motor equipment:— $\frac{1}{4}$  H.P. 110 Volt AC 60 cycle, single phase, swivel motor mount and light—\$25.00\*

\*All prices FOB Chicago.



- ★ **MILLS SMALL PARTS MUCH FASTER.**
- ★ **DRASTICALLY CUTS YOUR INVESTMENT IN EQUIPMENT.** Replaces expensive production machinery—or releases it for other jobs.
- ★ **INEXPERIENCED HELP CAN OPERATE IT.** Safe, simple, fool-proof operation.
- ★ **NO MORE COSTLY SET-UP TIME.** \$98.00\* price so low that it pays to keep one or more Hand Millers always set-up for special operations.
- ★ **YOU GET A BETTER PRODUCT**—the result of ABSOLUTE ACCURACY.
- ★ **A LOSS BECOMES A PROFIT** when marginal pieces are finished on the Hand Miller instead of on high cost equipment.
- ★ **VERY LOW MAINTENANCE.**
- ★ **USED REGULARLY IN 1163 MANUFACTURING PLANTS** (some of which use as many as 30 machines)—yet on the market a scant few years.
- ★ **UNIQUE—VERSATILE.** Nothing else like it. One or several machines can be the answer to some of your production problems.

**H. B. ROUSE & COMPANY**

2214 N. WAYNE AVE., CHICAGO 14  
50 YEARS OF SERVICE TO INDUSTRY

**Write today  
for further  
information.**



# Geneva DIAL INDICATORS

## Accuracy - Long Life - Low Cost

Here is a complete line of accurate indicators with the same precise workmanship characteristic of Geneva Lens Measures for opticians, and Geneva Depth Gages for engravers . . . their standard since 1896.

The simplicity of the Geneva movement is the secret of its accurate dial indicator readings. With a lever arm instead of a multiplicity of gears, the Geneva Dial Indicator has fewer moving parts . . . this means lower cost, and less chance for trouble and repairs.

Purchase Indicators Individually or in this

### Machinist - Tool Maker - Inspector Set



Includes Indicator,  
A.G.D. standard points,  
internal attachment,  
tool post holder,  
upright spindle,  
universal

holding sleeve,  
universal back,  
threaded shank,  
clamp—  
in sturdy,  
metal box

Set 125U—with .001" graduated Indicator . . \$22.50  
Set 135U—with .0005" graduated Indicator . . 24.50  
Set 145U—with .0001" graduated Indicator . . 37.50



This folder lists features and specifications of all Geneva Dial Indicators.

Free copy sent on request.

Profitable territories available to qualified dealers.

## CHICAGO DIAL INDICATOR CO.

Dept. C, 180 N. Wacker Dr., Chicago, Ill.



NO. 125F  
Graduated: .001"  
Range: .200"  
Revolutions: 2  
**\$10.00**  
with plain back  
and one point

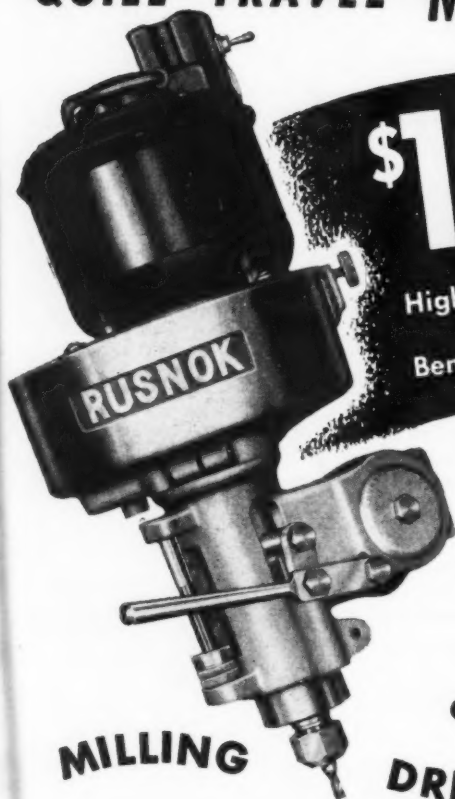


NO. 135F  
Graduated: .0005"  
Range: .125"  
Revolutions: 2 1/2  
**\$12.00**  
with plain back  
and one point



NO. 145F  
Graduated: .0001"  
Range: .060"  
Revolutions: 6  
**\$25.00**  
with plain back  
and one point

# CONVERTICAL QUILL TRAVEL MILL ATTACHMENT



**\$195<sup>00</sup>**

COMPLETE  
WITH MOTOR  
FOB Chicago

High speed, medium and light  
operation made for  
Bench, Floor and Pedestal Mills.

*New!*

FITS MOST MILLS INCLUDING  
SHELDON - NICHOLS - HARDINGE  
BURKE - ATLAS

ONLY LOW COST  
QUILL TRAVEL ATTACHMENT

**MILLING**

**DRILLING BORING**

- Quill travel 1½"
- Five spindle speeds  
380, 700, 1200, 2500, 5200 RPM
- Micrometer depth stop
- Positive Quill lock
- Forward, stop, reverse control

- Angular settings, single  
and compound
- Full use of table travel
- Time-saving settings
- Quick, easy speed change
- Light, efficient rigid

WRITE TO

TOOL

**RUSNOK**

FOR BULLETIN C

WORKS

4840 W. North Ave.

Chicago 39, Illinois

# USE ALLEN COLLETS.



YOU CAN DEPEND  
ON THEM FOR  
ACCURACY  
CONCENTRICITY  
LONGER LIFE  
I USE THEM, I KNOW!



WE WILL DUPLICATE  
COLLETS,  
COLLET TUBES,  
PUSHERS AND  
PUSHER TUBES

**MAIL COUPON TODAY!**

**ALLEN COLLET MFG. CO., INC.**  
17720 Claran Ave.  
Melvindale, Michigan

Please send catalog and prices.

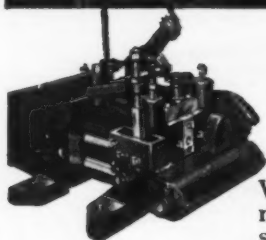
NAME \_\_\_\_\_  
TITLE \_\_\_\_\_  
COMPANY \_\_\_\_\_  
STREET NO. \_\_\_\_\_  
CITY \_\_\_\_\_ ZONE \_\_\_\_\_ STATE \_\_\_\_\_

**For Automatic Feeding to  
Punch Presses • Press Brakes**



A press brake equipped with Wittek No. 6-L Automatic Roll Feed

***You Can't Beat  
WITTEK***



Wittek Roll Feeds are made in standard models to meet every requirement in the automatic feeding of strip stock to punch presses or press brakes. The distinguishing feature is their simple and economical method of operation which does away with complicated parts thereby assuring *speed* and *accuracy* in the feeding of various kinds and thicknesses of material.

Wittek Adjustable Reel Stands are designed as companion units to Wittek Automatic Roll Feeds and are available in seven different models to handle *ALL* types of coiled strip stock and wire being fed to punch presses or similar production machinery.

Special units of Wittek Automatic Roll Feeds and Adjustable Reel Stands are engineered to meet unusual requirements.

Write for complete descriptive literature

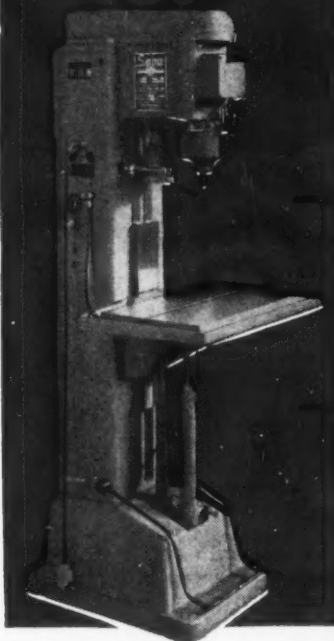
**WITTEK Manufacturing Co.**

4321 W. 24th Place  
Chicago 23, Ill.

***Automatic*  
ROLL FEEDS AND  
REEL STANDS**



*For Top  
Production*



Snow air operated—electrically controlled machines have built in full universal controls that allow selection of the type of spindle cycle desired. This feature also permits instant synchronization of the standard Snow Master Fixtures. All types of air operated automatic and semi-automatic jigs and fixtures are carried in stock. Standardization permits low cost tooling—and—high production.

Sensitivity of power application prevents tool breakage.

Simplicity of control means that set up and operation can be handled by a less experienced operator with minimum fatigue.

# SNOW

## FULL UNIVERSAL MACHINES

Air operated, electrically controlled Snow tools are establishing amazing production records daily on a wide variety of work. Just note these typical examples:

### DRILLING

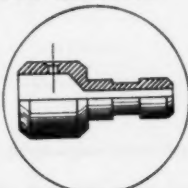
Crossdrill and C" T" Sink 1/16" Hole

Material—Brass

Production—4800 per hour

Fixture—#15 Vertical index

Equipment—#1-UD Drilling Machine



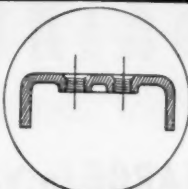
### TAPPING

Tap Two #10-32 Holes

Material—Steel stamping  
Production—3800 tapped holes per hour

Fixture—#14 horizontal index

Equipment—#1-UT tapping machine



### THREADING

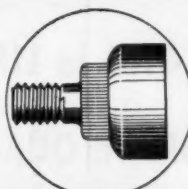
3/8"—24 Thread—1/2" Long

Material—Die Cast Aluminum

Production—2500 per hour

Fixture—#10 Drum dial

Equipment—#3-TR Threading machine



# SNOW

**MANUFACTURING COMPANY**

435 Eastern Ave., Bellwood, Illinois  
(Chicago Suburb)

Single Spindle Verticals • Two-Spindle Verticals • Two-Spindle Horizontals • Automatic Nut Tapping Machines • Drill Press Tap Heads • Automatic & Semi-Automatic Jigs & Fixtures

**Submit Sample Parts for Production & Cost Estimates**

SERIES 3900  
SELF-CENTERING  
SCROLL CHUCK



# SKINNER 3-JAW SCROLL Chucks

**LARGE in VALUE..**

**LONG in LIFE...**

**BIG in QUALITY...**

**LARGE IN VALUE...** because Skinner 3-Jaw Self-Centering Scroll Chucks are made with the most modern machines and by the most modern methods—there is more for your money in Skinner Chucks because accuracy is built in to last.

**LONG IN LIFE...** because every moving part is made of alloy steel, properly heat-treated, then ground to gage—and every moving part is grease lubricated from a single Alemite fitting. Interchangeability is a "must" in every Skinner Chuck.

**BIG IN QUALITY...** because, for 61 years, Skinner has provided chucks to meet the latest machine tool requirements. Skinner quality starts with modern design and makes itself evident in every step of construction. There are no better chucks made.

Write for your free copy of Catalog No. 61.

**THE SKINNER CHUCK COMPANY**  
341 CHURCH STREET, NEW BRITAIN, CONN.

CONSULT YOUR  
SKINNER DEALER  
FOR DETAILS



HAND & POWER OPERATED MACHINE CHUCKS—AIR CHUCK EQUIPMENT  
—FACE PLATE JAWS—MACHINE VISES



**Cut**  
Press  
"Down  
Time" with

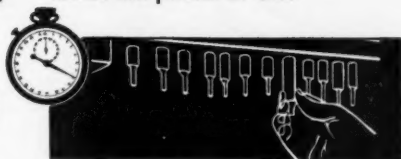


## R-B\* INTERCHANGEABLE PUNCHES and DIES



### EASY TO INSERT

Just a push and a twist and the punch or die is securely locked and accurately aligned.



### EASY TO REMOVE

Insert tanged tool, release ball bearing retainer lock, and out comes the punch or die.

R-B standard punches and dies are stocked for immediate delivery. Punches and dies of special sizes, shapes and materials made promptly to your specifications.

\*Richard Brothers

GET THE WHOLE STORY IN THIS 48-PAGE FREE CATALOG →



**ALLIED PRODUCTS CORPORATION**  
**RICHARD BROTHERS DIVISION**

DEPT. 51

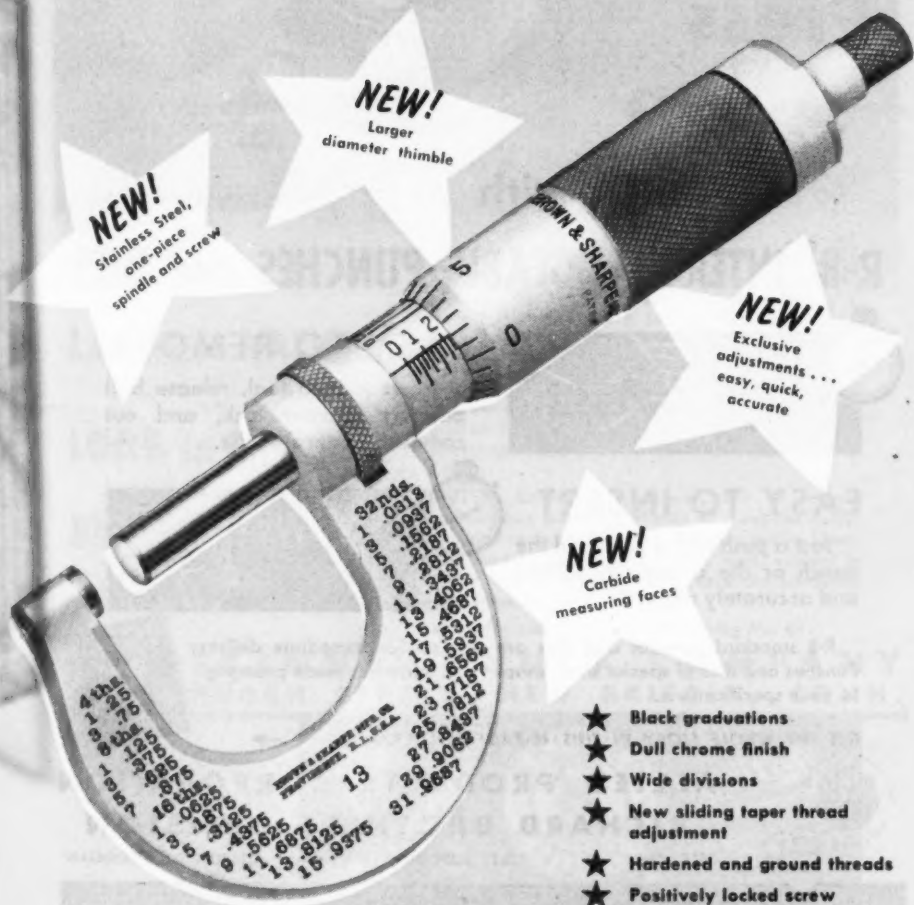
• 12621 BURT ROAD •

DETROIT 23, MICHIGAN

Also Produced in Allied's Four Plants . . . HARDENED AND PRECISION GROUND PARTS  
STANDARD CAP SCREWS • SPECIAL COLD FORGED PARTS • SHEET METAL DIES  
ALLITE DIES CAST OF ZINC ALLOY • JIGS • FIXTURES

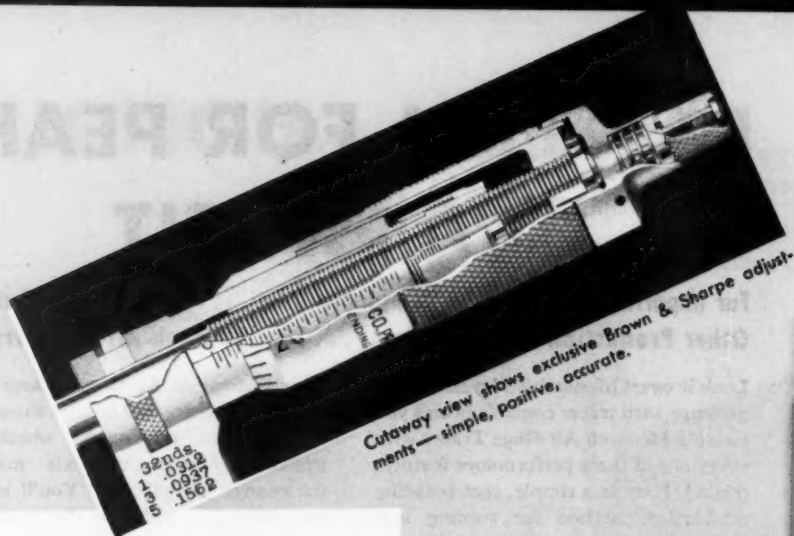
The **NEW** Brown & Sharpe

# MICROMETERS



*We urge buying through the Distributor*

- ★ Black graduations
- ★ Dull chrome finish
- ★ Wide divisions
- ★ New sliding taper thread adjustment
- ★ Hardened and ground threads
- ★ Positively locked screw and thimble
- ★ Quick, easy thimble adjustment
- ★ Rust-resistant
- ★ Available in complete range of sizes

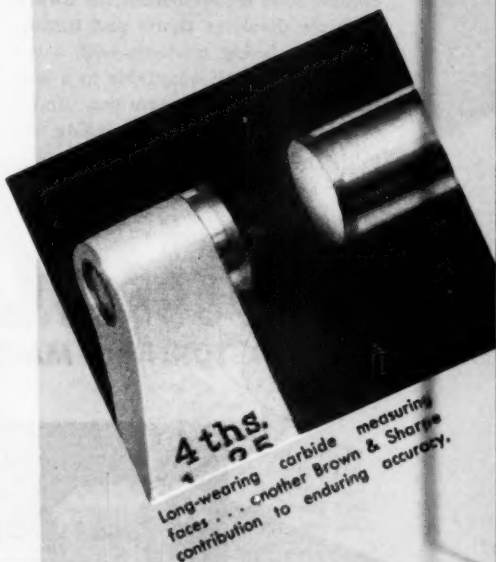


## *An exclusive combination of advanced features!*

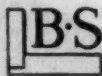
Never before has a line of micrometers offered such an outstanding combination of advanced features as the new Brown & Sharpe Micrometers!

Notice the widely-spaced divisions, black graduations and dull chrome finish . . . for easy, accurate reading. Observe the integral spindle and screw with simplified thread adjustment and longitudinal adjustment of thimble on screw. Consider what the long-wearing carbide faces and one-piece stainless steel spindle and screw with hardened and ground threads mean to durability!

Only an actual inspection of the new Brown & Sharpe Micrometers can show you all their advantages. See them at your tool supplier's. Write for folder on this completely new line. Brown & Sharpe Mfg. Co., Providence 1, R. I., U. S. A.



# **Brown & Sharpe**



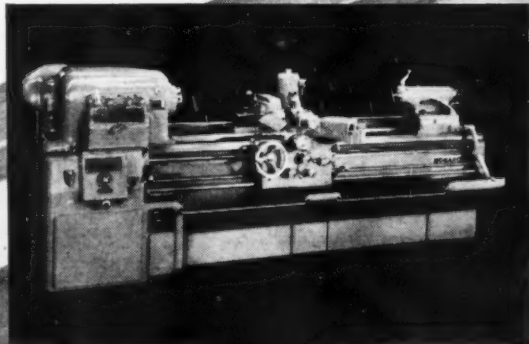
# PATTERN FOR PEAK PROFIT AT A PROFIT

**For Important Reductions in Machining Time . . . For Accuracy Exceeding Other Production Turning Means . . . The Monarch Air-Gage Tracer**

Look it over! Monarch's 21 years of experience with tracer controls brings you today's Monarch Air-Gage Tracer with every one of these performance features (right). Here is a simple, cost-reducing production method for turning machines. It is recommended for turning multiple diameter shafts and turning, boring or facing contours with a versatility making it adaptable to a large variety of turning operations. And it provides accuracy far exceeding any other lathe duplicating method.

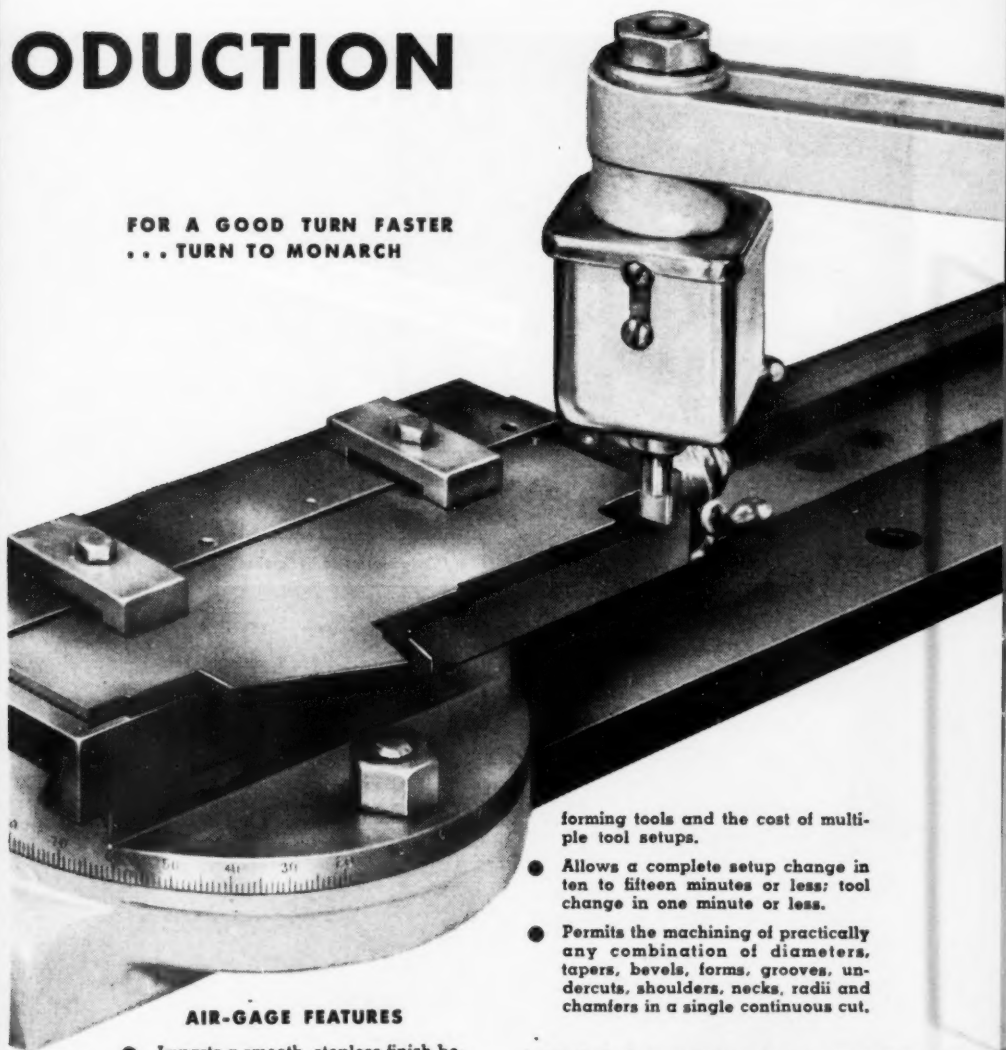
Every Monarch Air-Gage Tracer user knows that these advantages show dollars-and-sense reasons for obsoleting less efficient turning methods—making the change pay off *fast!* You'll know, too, when you examine the complete data in our Bulletin No. 2606. Ask for it—and/or the other Monarch Tracer Control Methods described in the convenient coupon. *The Monarch Machine Tool Company, Sidney, Ohio.*

**Monarch**  
TURNING MACHINES



# RODUCTION

FOR A GOOD TURN FASTER  
... TURN TO MONARCH



## AIR-GAGE FEATURES

- Imparts a smooth, stepless finish because of continuous, single tool cut.
- Generally reduces by half the amount of stock left for grinding.
- Often eliminates hand polishing or grinding because of the fine finish imparted to the work.
- Reproduces template form on work more accurately than any other duplicating device.
- Eliminates the need for expensive

forming tools and the cost of multiple tool setups.

- Allows a complete setup change in ten to fifteen minutes or less; tool change in one minute or less.
- Permits the machining of practically any combination of diameters, tapers, bevels, forms, grooves, undercuts, shoulders, necks, radii and chamfers in a single continuous cut.

## THE MONARCH MACHINE TOOL CO., Sidney, Ohio

Gentlemen: Please send without obligation the following complete Bulletins:

- ☐ Bulletin No. 2606—The Monarch Air-Gage Tracer
- ☐ Bulletin No. 2302—The Monarch Motor-Trace
- ☐ Bulletin No. 2401—Monarch-Keller Controls

NAME \_\_\_\_\_ TITLE \_\_\_\_\_

COMPANY \_\_\_\_\_

ADDRESS \_\_\_\_\_

CITY \_\_\_\_\_ ZONE \_\_\_\_\_ STATE \_\_\_\_\_

# To Buy the Best

## OPERATORS SAY —



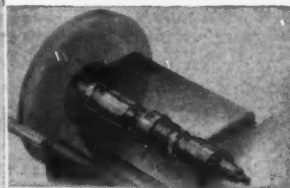
"Easier to handle"



"Like a push-button radio"



"Really holds size"



"Eliminates worry of work  
spoilage"

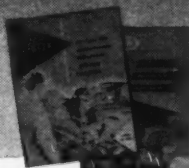
## MANAGEMENT SAYS —



"Outperforms earlier makes"



"Inspection costs reduced by  
uniform sizing performance"



Free catalogs on request.  
No. 1787 covers the 10"  
semiautomatic, No. 1488 the  
6" semiautomatic, No. 166  
the 10" plain and No. 157  
the 6" plain machine.

*Making better products to make other products better*

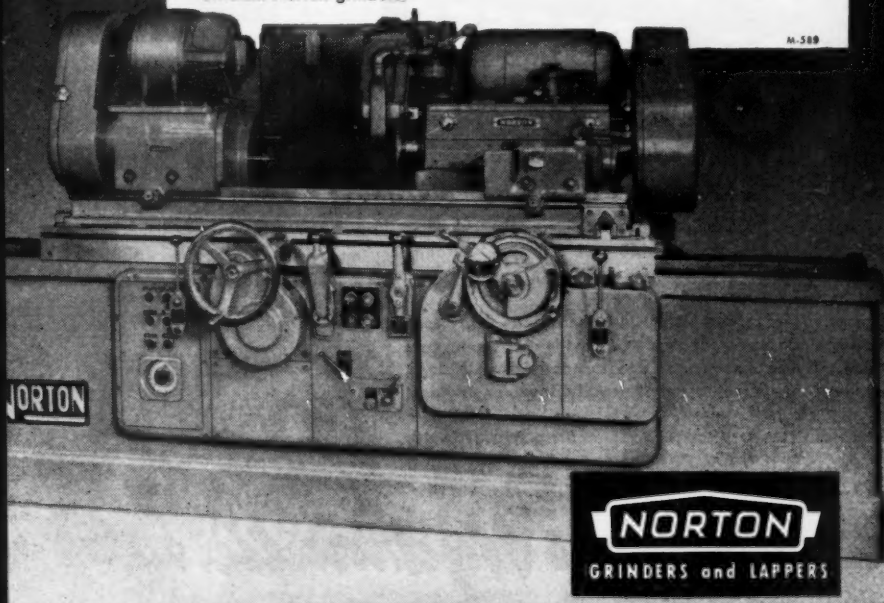


# in Cylindrical Grinders

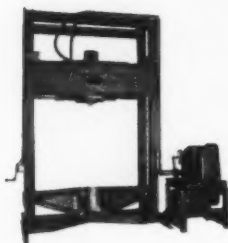
**Ask the Men Who Know  
the Norton TYPE CTU Machines**

**M**ANAGEMENT men and operators combine to put their stamp of approval upon the Norton Type CTU machines for these important reasons. Outstanding are the high productive capacity, superior quality of work, minimum floor space and reduced maintenance obtained with the 6" and 10" Norton Type CTU cylindrical grinders. Older or less productive grinders cannot successfully compete in these times of rising material and manufacturing costs. Use of more productive equipment is the only way costs can be substantially reduced. That is why it does not pay to keep obsolete models in production and ignore the cost savings and other important advantages that may be obtained from the strictly modern and more efficient Norton grinders.

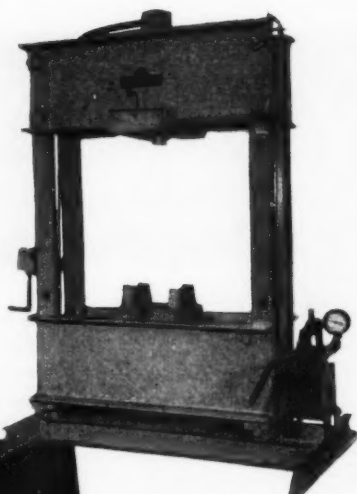
M-589



NORTON COMPANY, WORCESTER 6, MASS • New York • Chicago • Detroit • Cleveland • Hartford • Distributors in All Principal Cities



SPECIAL 150 Ton Open Yoke Vertical Press with adjustable head member and double-acting cylinder.



STANDARD 150 Ton Shop Press with new Rodgers 4-speed Hand Pump.

... THE FINEST PRESSES  
FOR THOSE 101 SHOP JOBS

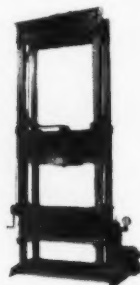
## Rodgers 150 AND 200 TON SHOP PRESSES

### Fast, Versatile Hydraulic Presses With Hand or Power-Driven Pumps

Here are versatile, time-saving presses you can use in a hundred ways—the Rodgers 150 and 200 Ton Hydraulic Shop Presses, operated with your choice of new 4-speed Hand Pump or Power Pump.

The standard 150 and 200 Ton Units include many construction and operating features, outlined in our new catalog. If specifications on the standard models don't meet your requirements, we'll modify them or build a special press as required.

There are standard model Rodgers Shop Presses in 60, 80, 100, 150, 200, 300 and 400 Ton Capacities!



SPECIAL 150 Ton Shop Press featuring a 96" opening with adjustable head and bolster.

#### SEND for CATALOG . . .

New Catalog 313 has descriptions and specifications on the complete line of shop presses.



# Rodgers Hydraulic, Inc.

7453 Walker St., St. Louis Park, Minneapolis 16, Minn.

**HYDRAULIC POWER EQUIPMENT**

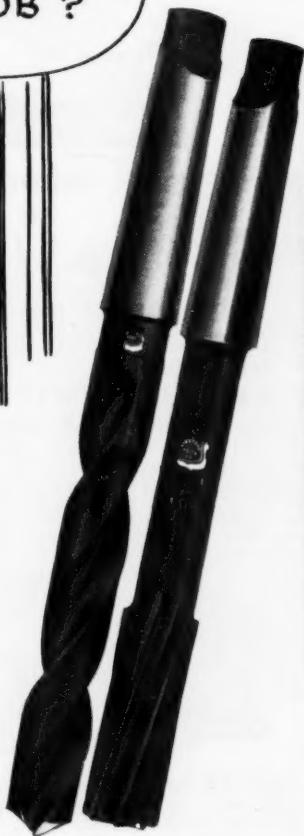


## STANDARDIZE—to make it easy!

**C**HANCES are your drilling problems are more down to earth than the one Red Shield is tackling here. But no matter what you have to drill—iron, steel, brass, copper, aluminum, plastic—there is a Red Shield Brand Drill that will give you the best work at the lowest cost.

That's because these drills—like all Shield Brand Tools—are Foremost Quality in design, construction, and workmanship. You can rely on them for uniform operating characteristics and fast, uninterrupted production.

Industrial Supply Distributors coast to coast stock and supply Standard Red Shield Tools. If you have a problem, call a Standard Service Man. He brings you the benefit of our 69 years' experience in solving tough metal cutting problems. There's no cost or obligation, of course.

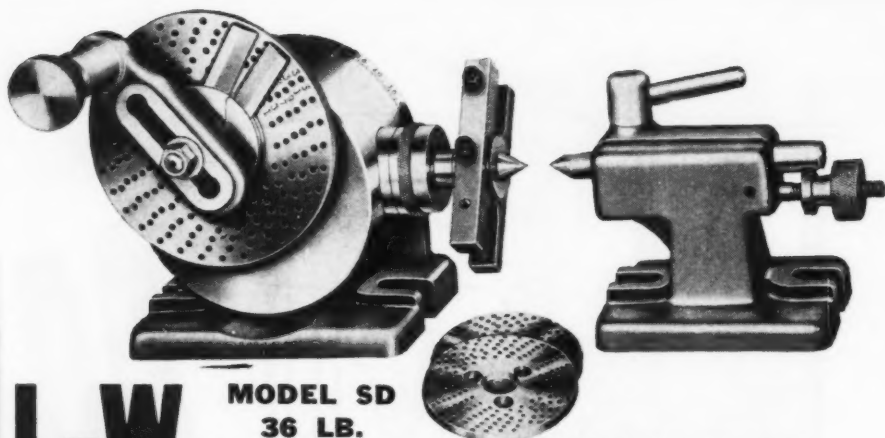


# STANDARD TOOL CO. CLEVELAND 4, OHIO

New York • Detroit • Chicago • San Francisco



THE STANDARD LINE: Drills • Reamers • Taps • Dies • Milling Cutters • End Mills • Nibs • Counterbores • Special Tools



# L-W MODEL SD 36 LB. 6-1/2" Swing DIVIDING HEAD

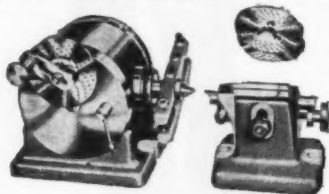
Ideal for Smaller Milling Machines

- \* ACCURATE
- \* RUGGED
- \* QUALITY CONSTRUCTION

Only \$119.30

SPINDLE THREADED 1 1/2"-8 TO FIT L-W 5" UNIVERSAL CHUCK

Heavy duty headstock and tailstock designed for maximum rigidity. Alloy steel threaded headstock spindle with extra large tapered bearing and takeup adjustment collar. Head tilts to 90° in vertical position. Alloy stress-proof steel worm and accurately cut worm wheel cut to close limits for accuracy. Ball bearing thrust and adjustable for end play. Complete with three index plates for dividing all numbers to 50 and even numbers to 100, except 96T. Index chart shows all divisions obtainable to 380. Right or left hand models.



Model BP 11" Swing for plain milling machines. Shipping weight, 140 lbs.

\$199<sup>54</sup>



Model AU 11" Swing. Fully Universal for complete indexing and spiral cutting. Shipping weight, 190 lbs.

\$296<sup>06</sup>

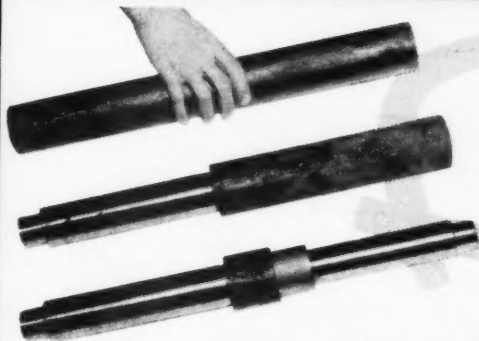
All Outstanding Values By America's Largest Builders Of Dividing Heads

Send for complete catalog giving prices and specifications on these quality, low-cost L-W Products



## L-W CHUCK COMPANY

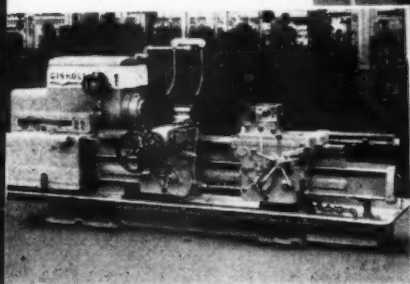
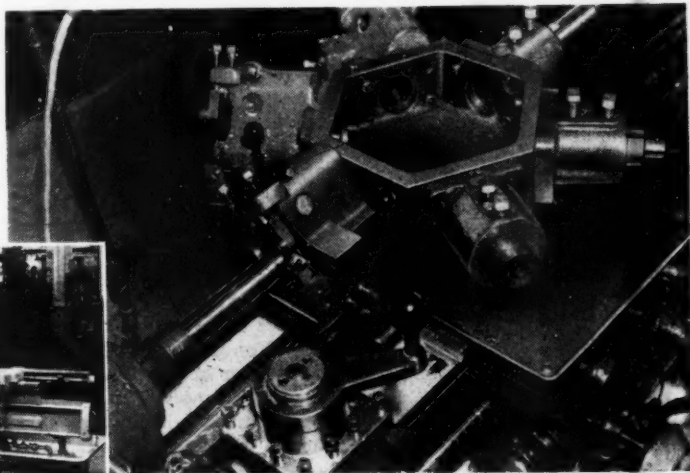
2350. ST. CLAIR ST.  
TOLEDO 4. OHIO



*take shaft jobs  
Like This:*

## they take less time on **GISHOLT TURRET LATHES**

*Yes, even in lots as small as  
5 or 10 parts, you can't beat  
turret lathes on this kind  
of work. Parts are machined  
complete in 2 operations—  
total time is less than 4 min.*



### **no extra equipment needed!**

With no more than your standard bar equipment, you're all set to cut machining costs on shafts like these. No previous operations . . . such as cutting to length or centering . . . are necessary. And with *two or more tools* from turret and side carriage, you have the basic advantage of turret lathe economy—the time saving that means lower costs.

Before you turn to extra equipment or special attachments, look into the possibilities of doing the job the quick and easy way on Gisholt Turret Lathes. Gisholt engineers will gladly help you.



THE GISHOLT ROUND TABLE represents the collective experience of specialists in the machining, surface-finishing and balancing of round and partly round parts. Your problems are welcomed here.



**TURRET LATHES • AUTOMATIC LATHES  
SUPERFINISHERS • BALANCERS  
SPECIAL MACHINES**

**GISHOLT MACHINE COMPANY**  
MADISON 10, WISCONSIN



***the "holes in our heads" are full***

**... OF COST-CUTTING IDEAS**

Yes, the "holes" in our engineers' heads are full of ideas to give you newer, faster, lower cost methods of boring . . . methods that save you time and money. If your job needs a special bar or special cutter, we'll design and make it. Chances are a standard Madison cutter in the right Madison bar will give you greater production economy. The Madison line, built over a period of thirty-five years, is broad enough to fit nearly any boring requirement. Let Madison's experienced boring specialists . . . the "men with holes in their heads" . . . help you cut your boring costs. Submit your problems for recommendations by our problem solving tool design department. Of course there's no obligation.

*Write for the information filled Madison Catalog. It is yours for the asking.*



**MADISON**

**MANUFACTURING COMPANY**

DEPT. BB

MUSKEGON, MICHIGAN



# GREATER CUTTING EFFICIENCY

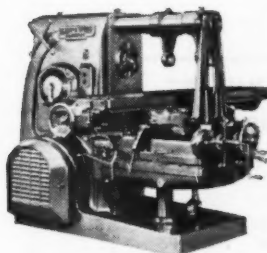


Here's the "business end" of a new CK milling machine — the spindle — with its new dynamically balanced flywheel and Kearney & Trecker's famous, original, extra-rigid, three-bearing spindle design. Added flywheel momentum gives you smoother, more positive cutter drive — the key to Greater Cutting Efficiency using modern cutting tools. And you get increased cutter life, too. The three-bearing spindle design affords ample support and greater rigidity. The heavy duty wide-faced spindle drive gears of forged steel are specially processed for longer life and exceptionally smooth, quiet operation.

A new line of knee-type milling machines

KEARNEY & TRECKER  
MILWAUKEE

## CK's



New Model CK  
25 hp Nts. 5 Plain Style  
Milling Machine

**YES.** Kearney & Trecker's new CK milling machines are packed with design and operating features that make them more productive, more profitable for you.

Spindle-mounted flywheel, broad feed and speed ranges and greater horsepower with separate motor drives for spindle, and feed and rapid traverse, mean you get fullest possible benefit from modern cutting tools.

New CK columns give you greater rigidity. Compared to former columns, they give you 1000 pounds more metal in heavier ribbing, in box-type, sponson construction to absorb vibration from heaviest cutting loads.

For greater production, these machines are equipped with Kearney & Trecker's famous Mono-Level Control that shortens floor-to-floor time, and materially re-

duces operator fatigue. New, non-glare micrometer dials help avoid costly errors in reading . . . give you a positive lock at every setting.

Automatic flood lubrication in column and knee and positive metered lubrication to table and saddle, plus generously proportioned gears and shafts assure you greater machine life.

Find out for yourself about Kearney & Trecker's new CK line of knee type milling machines . . . how they meet every demand of modern milling practice . . . how they can give you greater production at greater profit.

Sizes are No. 2, 3, 4, 5, and 6 . . . Plain and Universal styles. For complete details, contact your nearest representative or write direct. Kearney & Trecker Corp., 6784 W. National Ave., Milwaukee 14, Wisconsin.

REPLACEMENT OF OBSOLETE MACHINE TOOLS  
IS AN INVESTMENT THAT MAKES BOTH DOLLARS AND SENSE

February, 1951

KEARNEY & TRECKER  
MILWAUKEE  
MACHINE TOOLS





Cut expensive set-up time from hours to a few minutes with the revolutionary TREE taper boring tool. You can use it on your present milling machine, jig borer or boring bar. Write today for complete information. In addition to boring taper holes this tool can be used for —



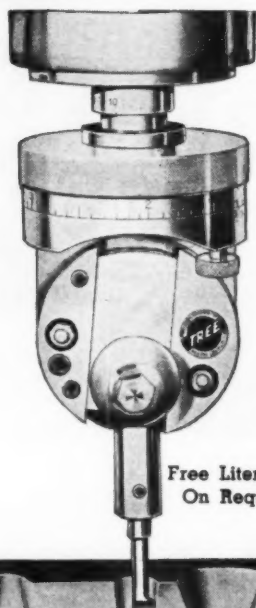
- Straight boring . . . as shown at left used as offset boring tool.



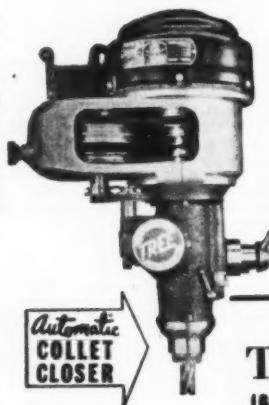
- Facing . . . up to 10" in diameter.



- Outside Turning . . . either straight or tapered up to 8" with extension bar.



Free Literature  
On Request



Automatic  
COLLET  
CLOSER

## TREE UNIVERSAL MILLING HEAD ATTACHMENT . . .

All Angle Milling, Drilling & Boring.  
Compact Design,  $\frac{3}{4}$ " Collet Capacity.  
4" Quill Travel. Power Feed Eight Speeds—  
140-3500 RPM or 210-5200 R.P.M. Hardened  
& Ground Spindle & Quill. Enclosed  
Micrometer. Depth Stop.

For Full Information — Write Dept. B

**TREE TOOL and DIE WORKS**  
1600 JUNCTION AVE. • RACINE, WISCONSIN

# Cast Iron machining dust giving you trouble?

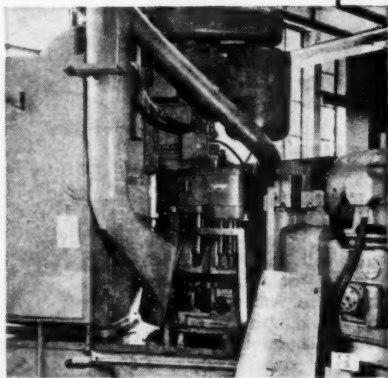
## IF SO YOU'VE GOT A JOB FOR ROTO-CLONE DUST CONTROL

**C**AST iron dust has long presented a collection problem. Now, with increased machine tool speeds and the tendency to concentrate a greater number of operations in a given area, there is an ever-increasing demand for a practical solution.

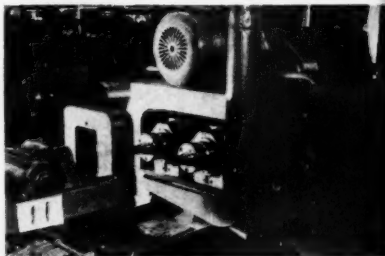
And here's the answer. Scores of companies are using Type D Roto-Clones\* successfully to exhaust and collect fine, floating cast iron dust from their machining operations. Whether it's drilling, reaming, boring, milling, turning or gear cutting, you are assured of positive dust control.

The Type D Roto-Clone is the most widely used dust collector in industry today. Its advantages are many—constant efficiency under all operating conditions, uniform air volume, small space requirements and ease of installation. When desired, a Cycoil Oil Bath After-Cleaner can be added which will provide the necessary cleanliness to permit recirculation of the cleaned air to the workroom.

For complete information on the application of the Type D Roto-Clone to cast iron machining operations, call your local AAF representative or write direct to—



*Roto-Clone Dust Control applied to Rebnberg-Jacobson Automatic which mills, drills, counter-bores and reams.*



*Ex-Cello Boring Machine equipped with Roto-Clone Dust Control.*



\* Roto-Clone is the trade mark (Reg. U. S. Pat. Off.) of the American Air Filter Company, Inc., for various dust collectors of the dynamic precipitator and hydro-static precipitator types.

# American Air Filter

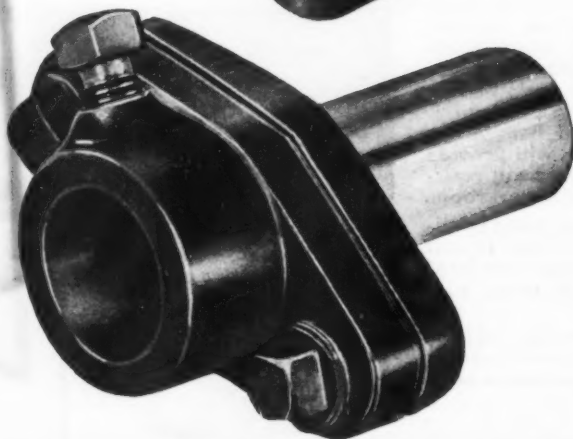
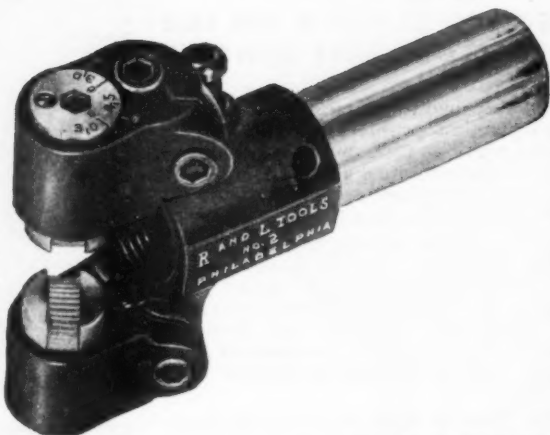
COMPANY, INC.

312 Central Ave., Louisville 8, Ky. • In Canada: Darling Bros., Ltd., Montreal, P. Q.

# R AND L TOOLS

## NEW! R and L KNURLING TOOL

New streamlined design has half the weight of existing tools of comparable size, affords better grip and controls of knurls. Available in a complete range of sizes. Only one Hex Wrench needed for all adjustments.



## R and L FLOATING DRILL HOLDERS

For Holding Drills —  
Reamer or other tools  
No. 00— $\frac{3}{8}$ " dia. shank  
No. 1— $\frac{1}{2}$ " dia. shank  
No. 2— 1" dia. shank

LARGER SIZES MADE  
TO ORDER

WRITE FOR CATALOG

# R AND L TOOLS

1825 BRISTOL ST., NICETOWN, PHILADELPHIA 40, PA.

# **REX** ROTARY CUTTERS & FILES



1. **PRECISION-GROUND BY MACHINE FOR GREATER ACCURACY AND UNIFORMITY**
2. **TOP QUALITY SHEFFIELD HIGH SPEED STEEL FOR LONGER LIFE**
3. **PERFECT-CONTROL SPIRAL FOR CLOSER TOLERANCES—removes more metal with less effort**
4. **GREATER CONCENTRICITY ELIMINATES CHATTER**
5. **COMPLETE RANGE AVAILABLE**
6. **STANDARD WITH ROLLS ROYCE AND BRISTOL AIRCRAFT**
7. **THEY COST NO MORE**

**TERRITORIES OPEN TO WELL  
ESTABLISHED DISTRIBUTORS**

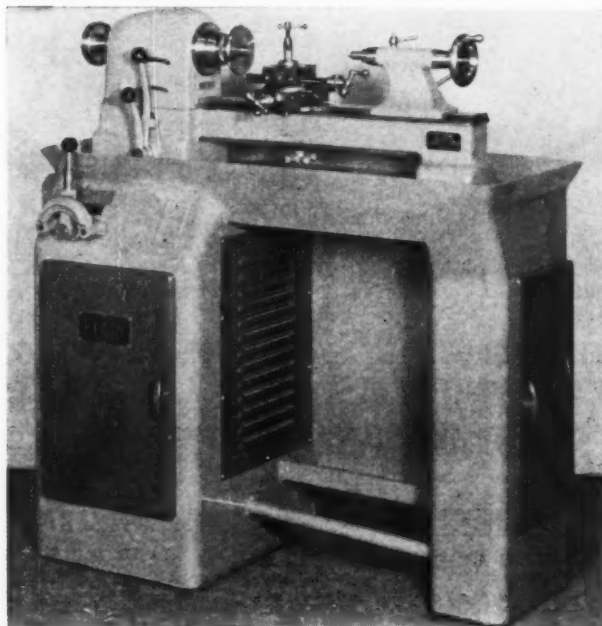
*Made by B. O. Morris, Ltd., Coventry, England—  
makers of rotary cutters for more than a decade.*

For prices and detailed literature write:

**R. Caluwaerts Co., Inc., 1 West 67th St., New York 23, N. Y.  
Sole U.S. Representative**

# **ELGIN** . . . . . NOW PROVIDES OPERATOR

COMFORT. . . . .



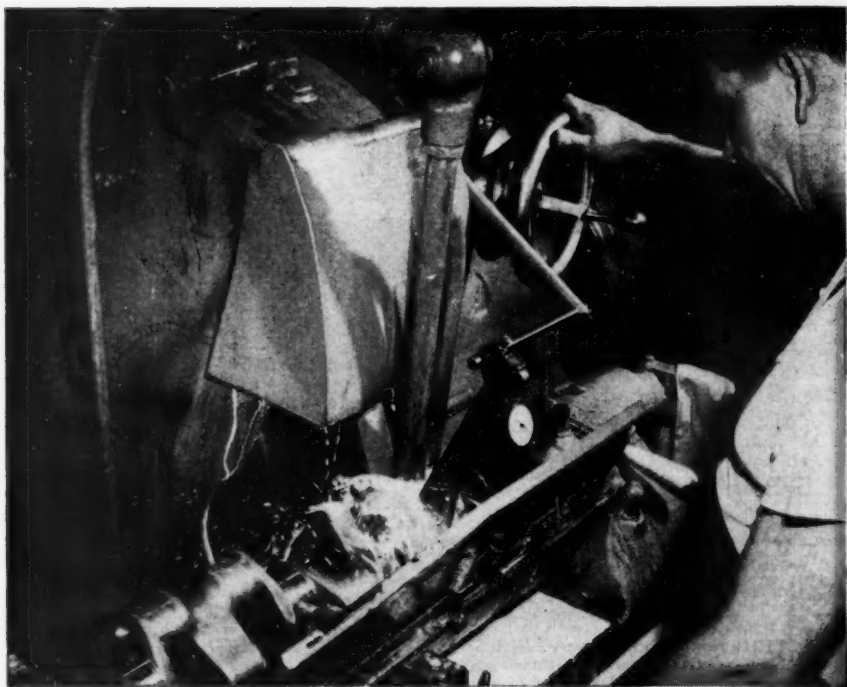
- The "Elgin Line" now is furnished with knee-hole bases with foot rests, permitting operator to sit comfortably, close-up and directly in front of work.
- Motor is mounted in base with direct cross ventilation.
- Three shelves are provided on right hand side.
- Collet board is on left hand door, below the convenient centralized controls.
- Variable speed drive provides stepless spindle speeds from 40 to 4000 rpm.

*Write for full details.*

## **ELGIN TOOL WORKS**

1772 BERTEAU AT RAVENSWOOD AVE. — CHICAGO, ILL.





## If a belt could do it better...

Grinding a crankshaft calls for a grinding wheel of definite specifications. But, if it could be done better, faster or more economically... with an abrasive belt, for instance... CARBORUNDUM would be free to recommend the *right* belt impartially. This is because only CARBORUNDUM manufactures a *complete* line of abrasives—and only CARBORUNDUM can

make impartial recommendation of the *right* abrasive to use in every grinding or cutting operation.

By standardizing on abrasives by CARBORUNDUM you get the benefit of technical advice on abrasive product use and latest developments in abrasives, without regard to production "limitations" in the abrasive field.

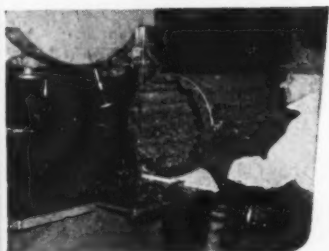
**Only CARBORUNDUM**  
TRADE MARK

**makes ALL abrasives to give you the proper ONE**

*"Carborundum" is a registered trademark which indicates manufacture by The Carborundum Company  
Niagara Falls, New York*

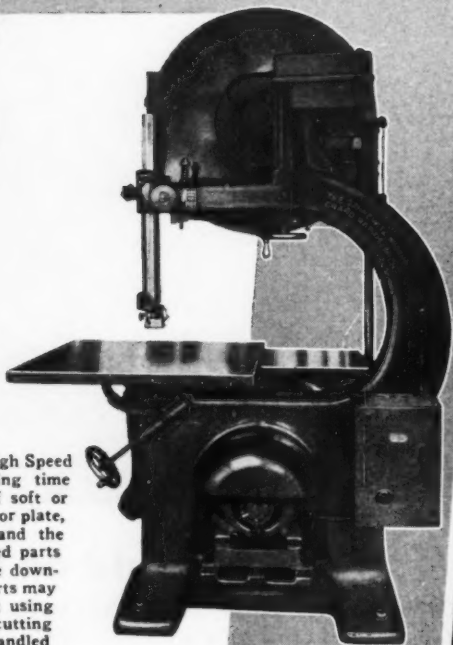


**Cutting Hard-Tempered  
1/8" Chrome Moley Steel**



**Sawing 16" Steel Piling**

## **Greatest Cost Saver in METAL CUTTING**



**F**Riction sawing with Tannewitz High Speed Band Saws results in perfectly amazing time savings in the cutting of flat sheets of soft or hardened steels, non-ferrous metals, armor plate, glass, plastics, many other materials and the trimming of castings. For cutting formed parts there's nothing to compare with it. The down-drag of the saw is so negligible that parts may be trimmed or sawn as desired without using a rest of any kind. Whatever your cutting requirements, chances are they can be handled faster and at less cost with Tannewitz High Speed Band Saws.

**THE TANNEWITZ WORKS  
GRAND RAPIDS, MICHIGAN**

**FRICITION  
SAWING**



**Write for Your  
Free Copy on Friction  
Sawing**

**with  
Tannewitz  
HIGH SPEED BAND SAWS**



Gear tooth crowning (Elliptoid Tooth Form) is used for just one purpose—to prevent "end bearing," which is a concentration of operating load at the end of the tooth where it is most vulnerable to failure.

Crowning is the only way to prevent end bearing because with any gear assembly it is impossible to maintain accurate gear alignment under all conditions of loading. Shafts, bearings and mountings are all elastic. Even the slightest deflection will cause misalignment and end bearing in gears with conventional teeth.

Many of the leading automotive gear plants have

standardized on crowning to raise the factor of safety of gear teeth and to reduce operating gear noise. Crowning does both successfully.

Crowning accomplished on Red Ring Gear Shaving Machines is a precision machining operation by which the maximum amount of crown is always under positive control. Tolerance control is indicated by a typical routine check of a lot of 4000 gears having the following specifications: 1" face, 18 teeth, 13.5 Nor D.P., 20° Nor P.A., 27° H.A. and .0003" to .0005" crown. An adequate check failed to reveal any unit outside the .0002" tolerance on crowning.

SPUR AND HELICAL  
GEAR SPECIALISTS  
ORIGINATORS OF ROTARY SHAVING  
AND ELLIPTOID TOOTH FORM



WRITE FOR BULLETIN 549-S FOR A MORE  
DETAILED DISCUSSION OF GEAR TOOTH CROWNING

**NATIONAL BROACH AND MACHINE CO.**

3600 ST. JEAN . . . . . DETROIT 13, MICHIGAN

WORLD'S LARGEST PRODUCER OF GEAR SHAVING EQUIPMENT

Want to reduce  
your TAP BILL  
50%? 59%?  
— even 75%?

**BLAKE**  
TAP SHARPENING  
EQUIPMENT  
DOES THIS  
FOR OTHERS



Ask for Bulletins 549 and 649

**EDWARD BLAKE COMPANY**

Black Diamond Precision Drill Grinders . . . Waltham Cutter Sharpeners . . .  
Waltham Thread Milling Machines . . . Surface Finish Standards.

440 CHERRY ST., WEST NEWTON 65, MASS.

**No 1.** in a continuing study of tap performance records made by users of Blake Tap Sharpening Equipment.

#### TAP PERFORMANCE

**Before Sharpening** Average standard Commercial Grd.  $\frac{1}{4}$ -28 tap cutting  $\frac{1}{8}$ " deep through hole in copper. Total holes per tap—3700.

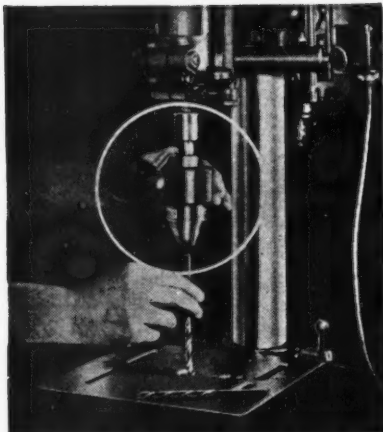
**After Sharpening on Blake Equipment** Tap reground with 18° hook in both flute and spiral point increases average holes *per grind* to 22,500—an increase of over 600% *per grind*. Average six grind per tap before it is discarded as too small or too short in thread length. Total holes per tap—135,000.

*Why Not You!*

To get dollar-for-dollar value from your taps, you *must* sharpen them just as you do other cutting tools. The Blake Flute Grinder and the Blake Chamfer Grinder provide you with fast, accurate, and economical means for grinding straight flutes, spiral points, and the chamfered ends of your taps — a sure means of reducing your tap bill. Investigate today.

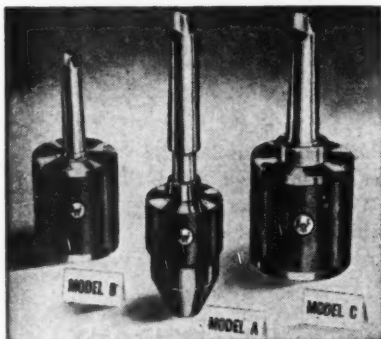


# Change drills in a second, safely with this Automatic Chuck while spindle is running



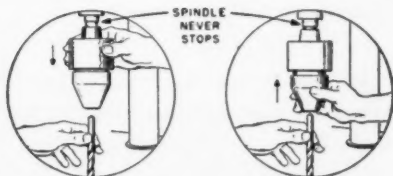
AMF Wahlstrom Chucks are rugged tools, proven out in many years of heavy production work. Simple construction assures ease of operation.

## THESE WAHLSTROM TOOLS CUT COSTS, TOO



Wahlstrom Chucks are available in several size ranges:  
Model A—1/32" to 1/2"; Model AA—1/64" to 3/8"  
Model B—15/64" to 1/2"; 3/8" to 3/4"; 17/32" to 1".  
Model C—Holds any size tool with No. 1, 2, or 3 M. T. Shank.

## HERE'S ALL THERE IS TO CHANGING DRILLS



1. Grip sleeve—pull down  
—jaws open automatically  
—drill is released.

2. Insert new drill—push  
up tapered part—drill is  
locked in place.

**You don't stop the machine** to change drills with the AMF WAHLSTROM CHUCK. No keys, collets or wrenches are needed.

**That's why Wahlstrom Chucks cut costly minutes** in changing tools for drill press work or for spotting, drilling and reaming in boring or milling machines. They'll also save money in lathe work for burring, turning, filing, etc. *One spindle does the work of several.*

**Tools last longer, too...**smooth, hardened and ground jaws grip tight without chewing into tools. Grip increases with the load.

**For fast, uninterrupted production,** use the quick-change AMF WAHLSTROM CHUCK. It is the only fully automatic drill chuck which holds the widest range of straight shank tools...Model A—1/32" to 1/2"; Model AA—1/64" to 3/8".

**See your local distributor or write today  
for Bulletin 56-4**

WAHLSTROM TOOL DIVISION, AMERICAN MACHINE & FOUNDRY CO.  
5502 SECOND AVENUE BROOKLYN 20, N. Y.

**WAHLSTROM**  
fully automatic  
**DRILL CHUCKS**  
NO KEYS, COLLETS OR WRENCHES



## TO DESIGNERS and MAKERS of TOOLS and DIES and PARTS

Have you considered the advantages of a single grade of ready-for-use oil hardening tool steel for **ALL** your requirements — flats and squares as well as rounds?

In rounds, for many years now, you have used and liked **WARPLIS Drill Rods** . . . the accuracy and uniformity, the flashing finish, the ease of working, the safe hardening and the non-warping characteristics . . . the excellent performance of the finished tools and dies and parts.

Now you may have exactly the same fine grade with the same characteristics in **WARPLIS Precision Ground Flat Stock** . . . flawlessly finished flats and squares, accurate, truly square, free of decarb . . . each piece indelibly marked with size and grade, and each in its own protective wrapper.

**WARPLIS** products in standard sizes and lengths are obtainable off the shelves of fine steel distributors from Coast to Coast. We would like to send you stock size and price folders and, if desired, the name of the distributor nearest you.

### **PITTSBURGH TOOL STEEL WIRE COMPANY**

Since 1902 . . . makers of drill rods and other cold finished fine steels in all sizes, grades and shapes.

**MONACA, PA.**

The steel in both products is identical . . . well bred, well behaved cold melt electric furnace tool steel of this well known analysis:

Carbon .....	.90
Manganese .....	1.10
Chromium .....	.50
Tungsten .....	.50
Vanadium .....	.15

. . . and a tidy little Notes on Hardening folder tells the heat treat story neatly and completely.

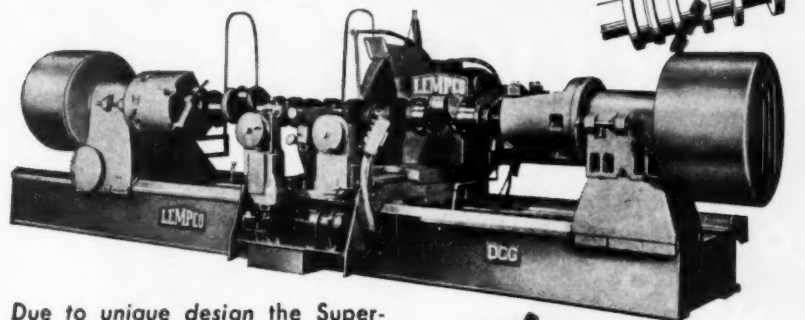
There's a wide range of stock sizes for your convenience . . . rounds from 1/32" to 1½" in 36" lengths . . . squares from ⅛" to 3" and flats 1/64" to 1½" thick by widths up to 10" in 18" lengths.

Within these ranges are the sizes you use mostly, but larger and smaller and in-between odd sizes can be furnished, also longer and shorter lengths, in case you need something special.

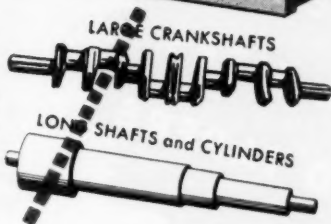


## DIESEL CRANKSHAFT and CYLINDRICAL GRINDER

with traversing wheelhead reduces  
initial investment by  $\frac{2}{3}$ —



Due to unique design the Super-size Lempco DCG Grinder is approximately half the length of other large grinders, yet equals or betters the capacity of other types and is available at  $\frac{1}{3}$  the cost.



### Look at this capacity:

Chucks a shaft up to 224" long with a 40" swing yet the entire machine occupies only 24 feet of floor space and is just 7 feet high. The grinding wheel has a hydraulic traverse and infeed that adapts itself for grinding long cylinders and shafts such as cam ground steel mill rolls, printers rolls in addition to diesel and industrial crankshafts.

Write for Bulletin on  
Diesel Crankshaft Grinders.

**LEMPCO PRODUCTS, INC.**

Industrial Division  
5490 DUNHAM ROAD  
BEDFORD, OHIO

# LEMPCO

**For 35 Years — a leading builder of machine tools**

*Glenzer*

# UTILITY Small Tool DRIVERS

COMPLETE  
LINE FOR  
ALL SIZES  
AND TAPERS

SAVE 40%  
and UP

*Utility  
Tools*



Each Glenzer Utility Sleeve supplies a removable taper shank for many small tools. Your operators get all the convenience and speed of taper shank tools with straight shank economy. Only the comparatively inexpensive straight shank tools are replaced. The Utility Sleeve supplies the taper shank for scores of them before it has to be replaced. Send for Circular A.

on your **SMALL TOOL COSTS**

THE J. C. **GLENZER** CO. Inc.

1546 E. NINE MILE ROAD, DETROIT 20, MICH.

**FINISH WELDS FASTER** *with the*



# **CLECO**

1480-A PNEUMATIC  
**EDGE GRINDER**

Here is the fastest and most economical tool ever developed for finishing off welds, cutting out defective welds, etc. It is especially useful for cleaning up stainless steel welds.

Users have reported that finishing costs have been reduced as much as 40 percent by using the Cleco 1480-A. Write for bulletin EG-349.

## **SEE CLECO FOR:**

Grinders, Sanders, Impact Wrenches,  
Scaling Tools, Screwdrivers, Chippers,  
Hose Fittings and Accessories.



# **CLECO DIVISION**

**of the REED ROLLER BIT COMPANY**

**5125 CLINTON DRIVE**

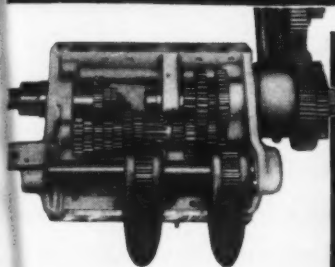
**HOUSTON 20, TEXAS**

# *IMPROVED* SOUTH BEND QUICK CHANGE GEAR MECHANISM *Saves Time*



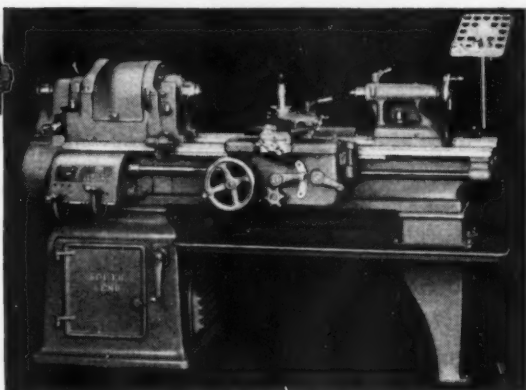
A new and simplified quick change gear mechanism is now supplied on South Bend 16" Precision Toolroom Lathes. It has been designed to save you time and provide long, dependable service.

A direct-reading index chart shows the settings of the two control levers for power feeds and screw threads. Changing from roughing to finishing feeds requires moving only one lever—no clutches or primary sliding gears to change. Special intermediate gearing for metric, worm or other unusual threads supplied to order. All gears and shafts are precision machined.



16" x 6" Precision Toolroom Lathe  
with 8-speed drive,  
f.o.b. factory . . . . **\$2,538.**

Price includes standard toolroom  
attachments; drum switch and 1½  
h.p., 220 V., 3 ph., 60 cycle motor.



Building Better Tools Since 1906 • SOUTH BEND LATHE • South Bend 22, Indiana

## Send Information On:

☐ 16" TOOLROOM LATHES

☐ LATHE ATTACHMENTS

☐ TIME PAYMENT PLAN



☐ 9" and 10"  
BENCH LATHES



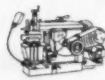
☐ 10" to 16-24"  
FLOOR LATHES



☐ 1/2" and 1" Collet  
TURRET LATHES



☐ 14"  
DRILL PRESSES



☐ 7"  
BENCH SHAPERS

Name \_\_\_\_\_

Company \_\_\_\_\_

Street \_\_\_\_\_

City & State \_\_\_\_\_

From the **DUMORE** Archives  
and, after all, we've been at it over 35 years



"Hassim handles all our finishing with his Power-Flexes"

## Get faster, lower-cost finishing with **DUMORE POWER-FLEX**

Here's the answer to the shopman's need for a flexible-shaft tool capable of handling cost-cutting carbide rotary files and carbide cutters.

With the Power-Flex, there's less end-of-day drop in output caused by fatigue, because the 6-ounce ball-bearing hand-piece is all the worker holds — the 20,000 RPM power plant stays on the bench. Jobs get going faster too, because there are no clumsy air connections to hook up — all you do is plug into the nearest electrical socket.

Why not see this cost-cutting tool at work in your own shop? Your Dumore Distributor will be glad to demonstrate its economies on tool and die work or production finishing. Call him today. Free Dumore Tool Catalog on request.

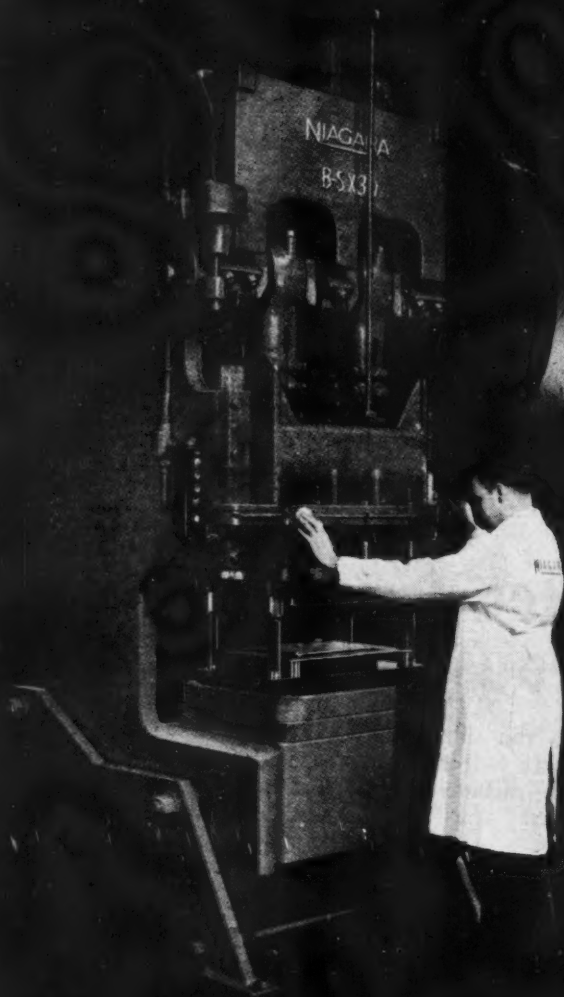
**THE  
DUMORE  
COMPANY**

Dept. B-27 Racine, Wisconsin  
Export Address: 13 East 40th Street,  
New York 16, N. Y., U.S.A.

DF-5



# NIAGARA



Niagara No. B1-5x30 Gap Frame Double Crank Inclined Press fitted with magnetic perforating dies made by S. B. Whistler & Sons, Inc., Buffalo, N. Y. Press equipped with air actuated electrically controlled sleeve clutch.

Write for Specifications

**NIAGARA MACHINE & TOOL WORKS • BUFFALO 11, N. Y.**



# PRESENTS

## No. BI-5x30 Double Crank Gap Frame Inclined Press with one-piece welded steel frame

- Gives full support to wide dies, impossible to obtain on the conventional single point Inclined Press even with slide flanged out.
- Gibbing may be brought closer to point of load application on this double crank press than with flanged slide single crank design.
- Two point suspension resists tendency of slide to tilt under off-center loading conditions.
- Niagara gap frame construction gives equal access to all four sides of die. No ribs or shafts extending across the back of press.
- Inclined position permits finished work to drop off the rear of the press.
- Gearing enclosed and running in oil.
- Backshaft mounted on anti-friction bearings.
- Air counterbalance for slide.
- Bronze bushed main and connection bearings.
- Niagara electrically controlled air actuated sleeve clutch.
- Air releasing brake.

Similar presses are made in sizes ranging from 3½" to 6½" diameter shaft. Sizes 3½" and 4" are made with mechanically operated sleeve clutch.

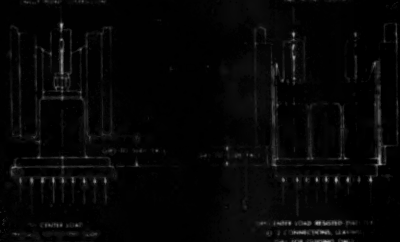


Illustration shows Niagara No. BI-5x30 press in inclined position.

Manufacturers of Presses, Shears, Machines and Tools for Plate and Sheet Metal Work  
**DISTRICT OFFICES: DETROIT • CLEVELAND • NEW YORK**



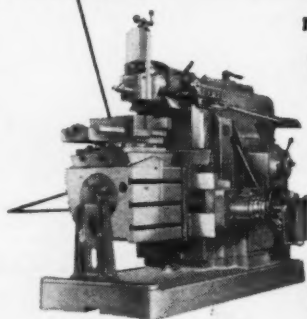
"GET NEW SHAPERS YOU  
ARE NOW PAYING FOR THROUGH  
COSTLY OBSOLESCENCE..."

INCREASE PRODUCTION  
WITH MODERN **GEMCO**

MATCHED-FOR-THE-JOB

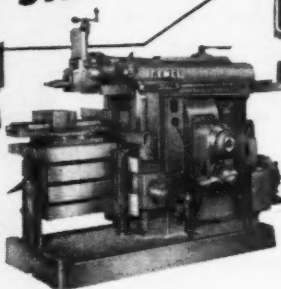
**PRECISION  
SHAPERS**

3  
MODELS



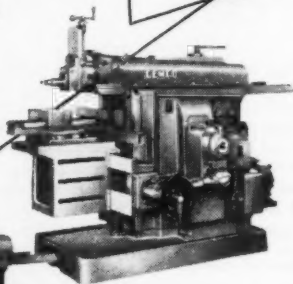
#### UNIVERSAL

For tool and die work and general machine shop work, requiring frequent changes and angular settings. In sizes from 16-in. heavy duty to 36-in. standard duty, with Front Table support. LUBRIGARD protected.



#### PRODUCTION

For general machine shop use and heavy production work. In sizes from 16-in. heavy duty to 36-in. standard duty and with separate Table and Apron and with Front Table support. LUBRIGARD protected.



#### PLAIN

For average machine shop use and light production work. Available in sizes from 16-in. heavy through 20-in. heavy duty. Equipped with plain table and with or without Front Table support. LUBRIGARD protected.

WRITE TODAY  
FOR BULLETIN  
GC 13M



• THEY'RE LUBRIGARD PROTECTED

**GENERAL ENGINEERING & MFG. CO.**

4417 OLEATHA AVE. • ST. LOUIS 16, MO.  
MANUFACTURERS OF PRECISION MACHINERY SINCE 1917



Here's how to

## SAVE TIME on Milling Operations

END MILLS		Time per slot	Number of complete slots before changing mills
End Mills previously used	Number of passes necessary to mill slot	9 min.	4-1/2
Cleveland End Mills	24 to 32	1-1/6 min.	27
	10		

The above figures, taken from an actual test on a roughing operation in a customer's plant, proved that **Cleveland** End Mills save time and money in cutting slots in a cast steel mold. ♦ There may be an opportunity for similar economies in *your* milling operations. Let a **Cleveland** Service Representative make a survey, without cost or obligation. Contact our nearest Stockroom, or . . .

Telephone Your Industrial Supply Distributor

### THE CLEVELAND TWIST DRILL CO.

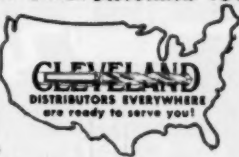
1242 East 49th Street

Cleveland 14, Ohio

Stockrooms: New York 7 • Detroit 2 • Chicago 6 • Dallas 1 • San Francisco 5 • Los Angeles 58

E. P. Barron, Ltd., London W. 3, England

ASK YOUR INDUSTRIAL SUPPLY DISTRIBUTOR FOR THESE AND OTHER **Cleveland** TOOLS



*"When Dependability Counts"*



**You can  
depend on  
HERZBERG**

Just as dependable names in firearms were essential in the "winning of the West" . . . Herzberg today brings that same dependability to the drill head field.

"DEPENDABILITY" . . . "EFFICIENCY" . . . "ECONOMY" . . . all are necessary factors to you, for these are the basis of production.

The Herzberg Corporation prides itself on offering you their services whether it be large or small Drilling and Tapping Heads or complete Drilling fixtures.

For Production with Economy and Efficiency, do it the dependable way . . . do it the Herzberg way.

Please Send for Our Free Folders.



***Herzberg*** CORPORATION

633 E. CENTER STREET

MILWAUKEE 12, WISCONSIN

**E**

# Enthusiastic Customers

do our BEST advertising

Standard Pressed Steel Co., Jenkintown, Pa., use No. 25 Grand Rapids Hydraulic Feed Surface Grinders in making the tools and dies that produce Unbrako Socket Screw Products, Flexloc Self-Locking Nuts and Hallowell Shop Equipment.



You will appreciate the micro-inch finish produced at production speeds on Grand Rapids Grinders. All Grand Rapids Hydraulic Feed Surface Grinders have these outstanding features:

1. One-piece column and base casting for vibrationless rigidity
2. Precision ball-bearing spindle which is greased for life
3. Bijur one-shot lubrication system eliminating hand oiling
4. Patented vertical movement of wheel head for quick, accurate adjustments
5. Portable coolant tank for ease of coolant replacement
6. Vane type hydraulic pump for fast longitudinal table travel

## *to serve you—*

Your inquiry concerning your specific grinding needs will receive prompt attention. Grand Rapids Grinders include: Hydraulic Feed Surface Grinders, Universal Cutter and Tool Grinders, Hand Feed Surface Grinders, Drill Grinders, Tap Grinders, and Combination Tap and Drill Grinders.

**GALLMEYER &  
LIVINGSTON**  
COMPANY

## **GRAND RAPIDS GRINDERS**

405 Straight, S. W., Grand Rapids 4, Mich.

# Atlas the Lowest Cost MILLING MACHINE!



- ★ Timken Bearing Equipped Spindle For Accuracy and Long Service
- ★ Backgeared Power For Heavy Cuts
- ★ Complete V-Belt Drive. Operates From 1/2 HP Motor
- ★ 8 Spindle Speeds, 62 to 2870 RPM
- ★ 4 1/2" x 18" Precision Ground Table
- ★ Reversible Automatic Power Longitudinal Feed

## SAVES HUNDREDS OF DOLLARS A YEAR ON SMALL PARTS MILLING!

Double savings are yours when you equip with this Atlas miller. It is the lowest cost milling machine on the market — *and* it slashes production costs on all small parts milling.

It handles the full range of milling operations with the precision and dependability of larger machines — from slabbing and facing cuts to end milling, keyways, finishing, and layout work. It frees your big machines from uneconomical handling of small jobs, saves money hours in setup time, reduces power costs substantially.

Any part that comes within the Atlas capacity can be quickly milled to close

tolerances. 8 spindle speeds provide the correct range for all types of work and cutters. Choice of manual, lever, or Change-O-Matic controls. Add an air chuck plus control devices, and the Atlas becomes semi-automatic, capable of surprising production runs.

*Send for detailed catalog.*

### ATLAS PRESS CO.

250 N. Pitcher Street  
Kalamazoo, Michigan



**MATCHED PRECISION TOOLS FOR  
WOODWORKING AND METALWORKING**



**DANLY  
PRECISION  
DIE SET**

**2100 South Laramie Ave.  
Chicago 50, Illinois**



# DAILY





# IT'S HERE!

## WESTERN UNION

1951

### CLASS OF SERVICE

This is a full-rate Telegram or Cablegram unless its deferred character is indicated by a suitable symbol above or preceding the address.

### SYMBOLS

DL	= Day Letter
NL	= Night Letter
LC	= Deferred Cable
NLT	= Cable Night Letter
Shop Radiogram	

W. P. MARSHALL, PRESIDENT

The filing time shown in the date line on telegram and day letters is STANDARD TIME at point of origin. Time of receipt is STANDARD TIME at point of destination.

LD300 PD CHICAGO ILL SEP 25 1950 132P  
TO EVERY GRINDING WHEEL USER  
PRODUCTIONTOWN, USA

YOU NEED IT NOW -- AND IT'S READY. EXHAUSTIVE TESTS  
PROVE 79E WHEELS AND POINTS POUR IT ON! URGENTLY  
SUGGEST YOU TRY SAMPLE. COUNT ON 10-15% BOOST IN YOUR  
GRINDING AND FINISHING OUTPUT.

CHICAGO WHEEL & MFG CO.



### Send for FREE Sample Wheel!

Chicago Wheel invites you to try its new "79E" Bond where it counts most . . . right in your own plant, on your own type of production. Just fill in the coupon at the right and mail.

**79E** Another Exclusive Development of

## CHICAGO WHEEL & MFG. CO.

# "79E"

## THE NEW MIRACLE GRINDING WHEEL BOND

THAT GIVES YOU  
**79E** XTRA MINUTES OF  
VITAL PRODUCTION  
EFFICIENCY EACH DAY!



CHICAGO WHEEL & MFG. CO.  
Dept. MT, 1101 West Monroe Street  
Chicago 7, Illinois

Please send us our FREE sample of the new "79E"  
Bond (check which):

☐ Grinding Wheel

☐ Mounted Wheel

Name .....

Firm .....

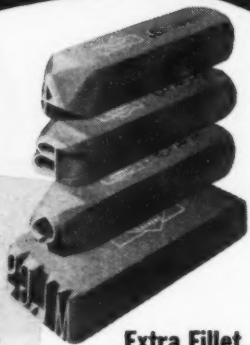
Address .....

City ..... Zone ..... State .....

1101 West Monroe Street  
Chicago 7, Illinois

**True in 1899... True today..**  
**You Get BETTER MARKING with**  
*Pannier "Master Markers"*

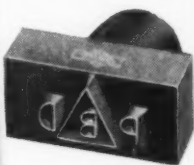
**Steel Forging  
Stamps—Hand,  
Eye & Fullered**



**Embossing Dies**  
(female shown)

Famous in the steel industry for their durability and "good impressions", these Pannier "Master Markers" are *still* your best bet for efficient and clear-cut marking of steel and steel products. Write for full information today.

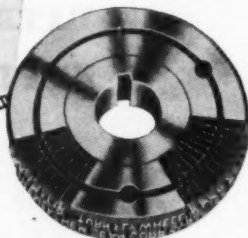
**Extra Fillet,  
Double Bevel  
Steel Stamps—  
letter, figure,  
symbol, name.**



**Stamping Dies**



**"Supreme" Steel  
Type & Holders**



**Roller Dies  
and Segments**



**THE PANNIER CORPORATION**

**203 Pannier Bldg.**

**Pittsburgh 12, Pa.**

## featured in this issue

**Difficult Clevis Job Milled 3 Times Faster with Inserted Carbides**, by Jack Hunter. The secret of successful carbide milling lies in the angle of the bit and the design of the inserted blade cutters. An interesting application of this process has increased production for the Byron Jackson Co. Page .....105

**Special Report on Chucking Machines, Turret Lathes, Hand Screw Machines; Part 1.** This is the ninth in the current series of special reports on various types of modern machine tools; this article includes a review of the uses of chucking machines, descriptions of late models, and tables of specifications of American-built machines. Reprints of previous reports available. Page .....108

**Letter from Great Britain**, written by Robert Hutcheson, editor of Machine Shop Magazine, London, England. This regular feature contains timely economic and industrial data on recent developments in the United Kingdom, compiled by a authority in the field. Page .....141

**Effective Dust Control in Saw Manufacturing**, by S. H. Fain. In the manufacture of saws, the dust problems in a plant are varied and complex. Since the quantities, characteristics and natures of the dusts released usually differ so widely, it is necessary to evaluate each operation for the effective methods of exhaust ventilation and dust control. Page .....153

**Interesting Jigs and Fixtures Developed by Western Manufacturers**, by Frank Charity. The high productivity which Western manufacturers must obtain in order to meet Eastern competition has resulted in the development of many types of unusual jigs and fixtures. Some of these devices are discussed in this article. Page .....167

**Shop Hints.** Page .....183

**Modern Tools in Action.** Page .....201

**Get More Production from Job Methods Training**, by Ed Mottershead. The author of the "Foremanship Forum" series is now presenting a group of four articles describing employee training and job instruction programs. This month's article, part 2 in the series, should prove useful in the intelligent treatment of industrial plant personnel. Page .....221

**Available Literature.** Page .....247

**What's New in Metalworking.** Page ...265

**Mechanics Through the Ages.** Page .....354

**Product Index.** Page .....356

**Index to Advertisers.** Page .....356

### SPECIAL REPORTS

In this issue Chucking Machines, Turret Lathes, and Hand Screw Machines are discussed. The report will be in two parts of which the second will appear next month. Other reports in progress include: Broaching, Shapers, Slotters, Lathes. They will appear in future issues of the MACHINE and TOOL BLUE BOOK.



# TIME TIME

*CUT in half!*



Write for Bulletin R-29

"Cincinnati Bickford Super Service Radial Drills are the fastest and most efficient for our work."

We quote the Package Machinery Company of Springfield, Massachusetts — and again, "The job is very intricate: 32 holes accurately laid out are drilled and reamed, two at a time; depth, 6 inches. Tapping to 1¼ inches is done singly."

Actual cutting time one-half that of previous machines used. The controls are very handy, and the machine is dependable for accuracy.

**THE CINCINNATI BICKFORD TOOL CO.** Cincinnati 9, Ohio U.S.A.



*as the editor sees it***People Who Live in Glass Houses...**

These are days for mighty criticisms, when our leaders feel the discontentment of the people. And it is proper, in a democracy, that you and I should raise our voices in disagreement and complaint. Only through the collectively expressed, but intelligent, grumbling of all of us will our leaders be spurred into more urgent action. And yet, in these trying days, when events make it clear that our existence and life as we want it, is at issue, indiscriminate complaining by every comfort-loving groaner who is long on wailing and short on working, serves but to promote disunity, at the same time aiding the forces marshalled against us. Also, before we toss that rock we're hefting for weight, let us examine our own work to prevent someone from heaving that rock back at us.

Let us ask ourselves some professional questions!

Have we correctly estimated our capacity and our product, or do we have to waste dear time calculating, figuring, and juggling to determine what product we can most efficiently manufacture, and at what maximum volume? If we have a battery of screw machines and can zip out small parts in quantities like snow from the skies, let's stick to quantity small parts and not become wild with enthusiasm and brag about how quickly and how well we can turn railroad wheels.

If we plan to be prime contractors we must know, further, what's to be farmed out, and to whom. We must know the capacity of the sub contractor, the condition of his equipment and the kind of help he'll need when the going gets rocky . . . and he'll need help. So will we. Consequently . . .

what's the condition of our equipment? What tools need overhauling? Are they ready to serve a 24-hour day, 7 days a week? Let's get them into shape now. We always think our shop is in the pink of condition while the other fellow's is a bit green around the gills, but . . .

are we really as efficient as possible? What about shop layout? Materials handling? What equipment needs replacing? Has it been ordered, or are we "waiting to see"? Machines are useless unless someone operates them . . .

are we set up to recruit labor? Are we beginning to locate and warm up a labor pool in our areas? Planning training programs? Upgrading workers?

Many, many more questions stare us in the face every time we walk through the shop. They all need answers.

Discussing the other fellow's operation with a critical voice is human nature. Let us not discontinue to direct our screaming at Washington; but having blown off steam let's turn to our own operation and do the work that needs doing. Our only job today is planning for the job tomorrow.

*William F. Schleicher*

*It's not size  
but performance  
that counts!*



## KRW ARBOR PRESSES

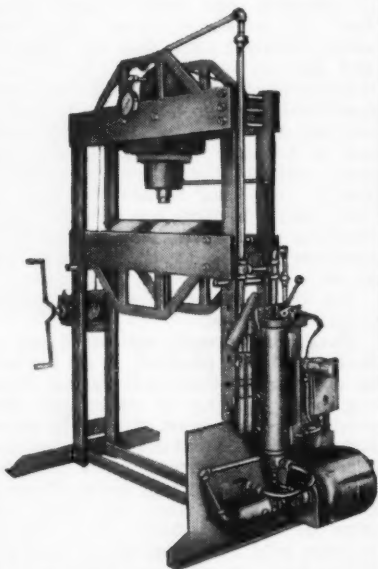
*Do 101 bending, straightening, offsetting jobs better!*

"Man, what a work horse!" That's what manufacturers all over the country are saying about these KRW hydraulic arbor presses. They've really become man-sized production tools in hundreds of industries. In addition to the standard bending, straightening and flattening operations, KRW hydraulic presses combine with inexpensive dies on hundreds of operations formerly done on costly heavier equipment. What's more, they cut your manufacturing costs by releasing heavier, more expensive presses for larger work.

KRW Hydraulic arbor presses are available in 25, 50, 60 and 75 ton capacities. Either vertical or horizontal ram travel. Hand-operated, air operated or motor driven.

Incidentally, our engineers thrive on special problems. So if you need a custom-made press, let us know. We'll build it to your specifications.

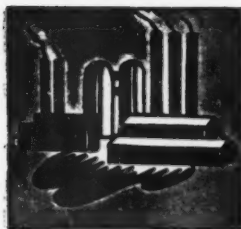
Ask your local machinery dealer to quote you prices. Or write or wire Dept. 13 for full facts and prices.



*Illustrated is No. 37 MD-1 Motor Driven Hydraulic Press. One of the KRW standard line available for immediate delivery.*

# K R WILSON

215 MAIN ST. • BUFFALO, N. Y.



# MTBB

FEBRUARY, 1951

## How's Business

### DO for Capital Equipment

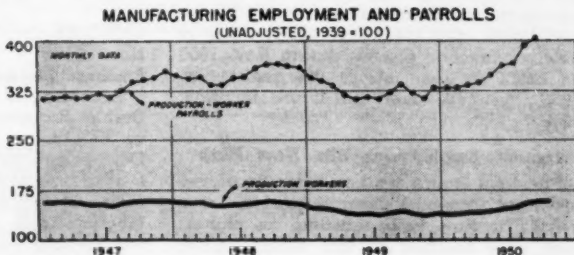
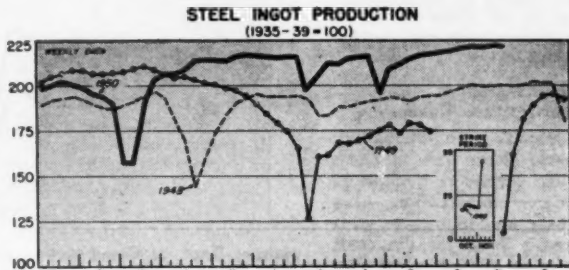
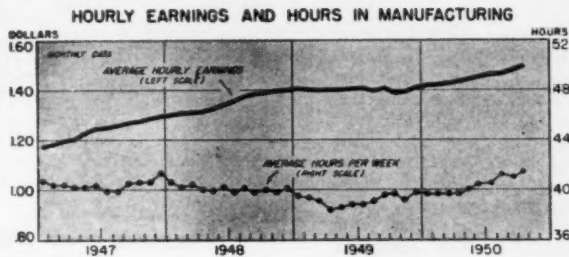
Industrial firms can obtain capital equipment with a DO rating if it is essential to defense production. Regulation 2 of National Production Authority, Section 11.6 authorizes use of DO ratings to obtain materials (defined in Section 11.2 (b) as "any raw, in process or manufactured commodity, equipment, component, accessory part, assembly or product of any kind"). Section 11.5 further states that a DO rating may be used to rate orders for "production materials and components, including packaging and chemicals" which may be essential to complete the order.

The National Production Authority's interpretation is, basically, this: A DO rating cannot be used to get capital equipment, except when the priority is needed to get machinery to carry out a rated order. The U. S. Army, Navy, Air Force, Atomic Energy Commission, National Advisory Committee for Aeronautics and the Coast Guard have been empowered by the N.P.A. to use DO ratings in order to obtain needed equipment.

### Steel Prices Hiked

Manufacturers of metal-

### GENERAL BUSINESS INDICATORS



source: Dept. of Commerce

working equipment are having to re-estimate their costs on the new basis of higher steel prices and possible wage increases, as a result of the recent rise in steel wages and prices. According to the U.S. Steel Corp.'s agreement, wage increases of from 12½ to 28 cents an hour have been granted the union; the wage increase will cost U. S. Steel's subsidiaries an estimated \$125 million per year, or the equivalent to 5½% of the present average prices of a ton of steel. The new wage agreement does not affect other provisions of the contract which will continue until its expiration date, Dec. 31, 1951. A further increase is slated by United Steelworkers from metal-working companies with which it has contracts, amounting to increases of up to 16 cents an hour; such demands may be negotiable.

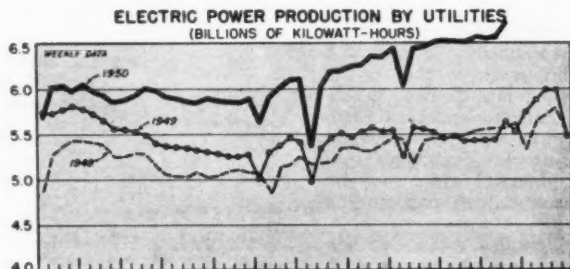
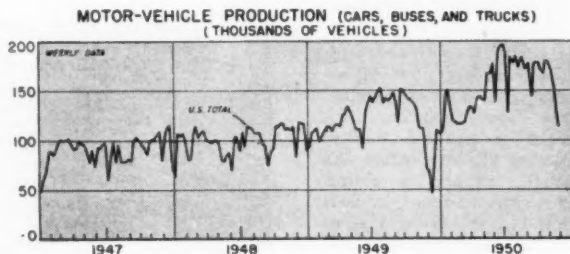
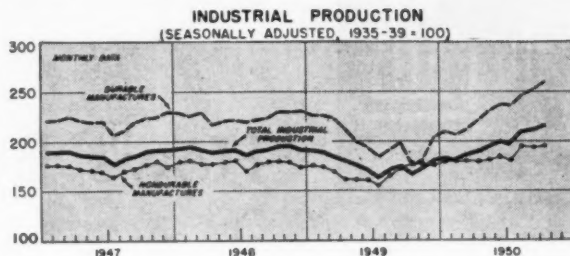
#### Non-Residential Construction Holds

Increased non-residential construction last month (Nov.) offset a decline in home construction; the totals set construction at a record level for the final quarter of the year. Reports issued by the Departments of Commerce and Labor give the value of all types of new construction erected during Nov. 1950 as \$2506 million; this is 8% under Oct. 1950, but 23% over the figure for Nov. 1949.

#### Industrial Employment Hits New High

The total figure for non-agricultural employment (includes manufacturing) rose 448,000 in Nov. 1950, reaching the highest total ever touched in that month. Commerce Department totals for this classification are 53,721,000 in November, as against

### GENERAL BUSINESS INDICATORS



source: Dept. of Commerce

53,273,000 in October, and 51,640,000 in Nov. 1949.

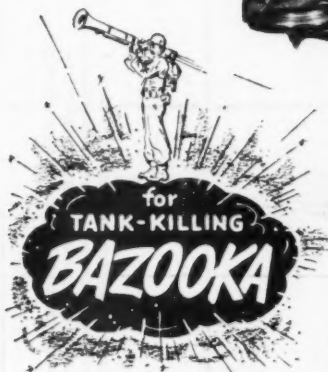
#### Business Failures

According to figures recently released by Dun & Bradstreet, business failures were up in October over September, but below October for 1949. Business failures reached a total of 707 in October, 9% above the figure of 648 in September.

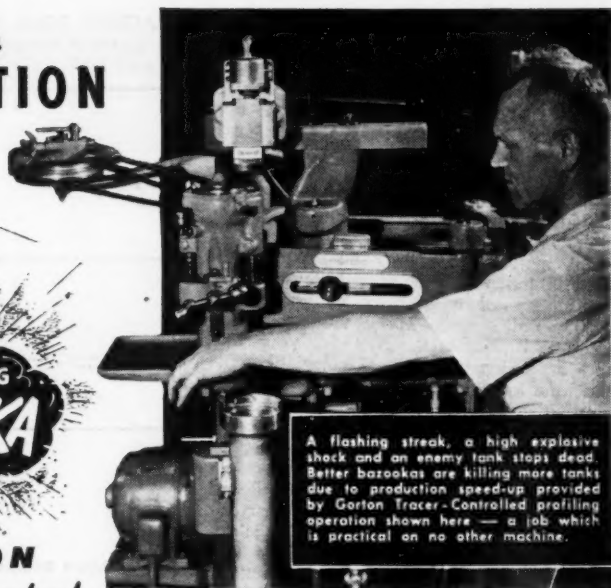
#### Machine Tools

It is generally conceded by industry spokesmen that the machine tool industry will continue its large output for a long

# *Faster* **PRODUCTION**



**GORTON**  
*Tracer-Control*



A flashing streak, a high explosive shock and an enemy tank stops dead. Better bazookas are killing more tanks due to production speed-up provided by Gorton Tracer-Controlled profiling operation shown here — a job which is practical on no other machine.

## ● SPEEDS PRODUCTION ● CUTS COSTS

On many all-but-impossible jobs, Gorton Tracer-Controlled Pantographs and Duplicators speed up production on military or industrial contracts. High surface finish results from spindle speeds up to 45,000 R.P.M. Accuracy results from the use of over-size masters, patterns, or templates together with the reduction ratio which is exclusively characteristic of the pantograph. Whether a dozen or a thousand pieces, each is identical to the first. Work piece size varies from instrument parts to areas of 10 to 20 feet.

Gorton tracer-controlled equipment quickly pays for itself in profiling, routing, die sinking, mold cutting, counterboring, chamfering, grooving, graduating, engraving as well as many other standard or special operations on ferrous or non-ferrous metals and plastics where work is flat, uniformly curved, cylindrical, spherical or irregular in shape.

Mail the coupon below for General Catalog illustrating the complete Gorton line.

## PRODUCTION DATA

**JOB:** Profile 6 locking lugs for male and female sections of new 3.5" Bazooka

**MATERIAL:** Aluminum alloy  
**CUTTER:** 5/32" dia. single flute, fast spiral H.S. steel running at 3,900 R.P.M., without coolant

**MASTER:** 2 masters: one for male and one for female sections; 3 times oversize, traced manually

**HOLDING FIXTURE:** Pneumatic-operated internal expanding type

**APPROX. TIME:** 36 pieces per hour

**ALTERNATE METHODS:** None practical



Please send at once complete information about the Gorton line contained in Bulletin 1655-1462.

Firm .....

Name .....

Title .....

Address .....

City, State .....

time to come and will, furthermore, increase its production as soon as some of its pressing manpower and materials problems are solved. The index for October 1950 stood at 290.5 (Base: average shipments 1945-1946-1947=100). Of this figure 48.4 was earmarked for export.

Big problems confronting the industry will be manpower and materials. To date the government has taken little action on the needs of the machine tool industry for steel, motors, etc. The need for materials in this industry will soon become acute. Production of tools prior to Korea was 45,000 units; since Korea the output has risen to 75,000 for the calendar year, and for a custom-building industry like the machine tool industry this is a fair expansion. It is not, however, anywhere near the capacity of the industry and with full scale mobilization is but a drop in the bucket of over-all demand.

It is estimated by the Munitions Board that an output of 200,000 units a year are needed to meet the emergency. This is not an impossible goal for the machine tool industry. But unless clear-cut instructions and help is forthcoming from Washington this figure cannot be met.

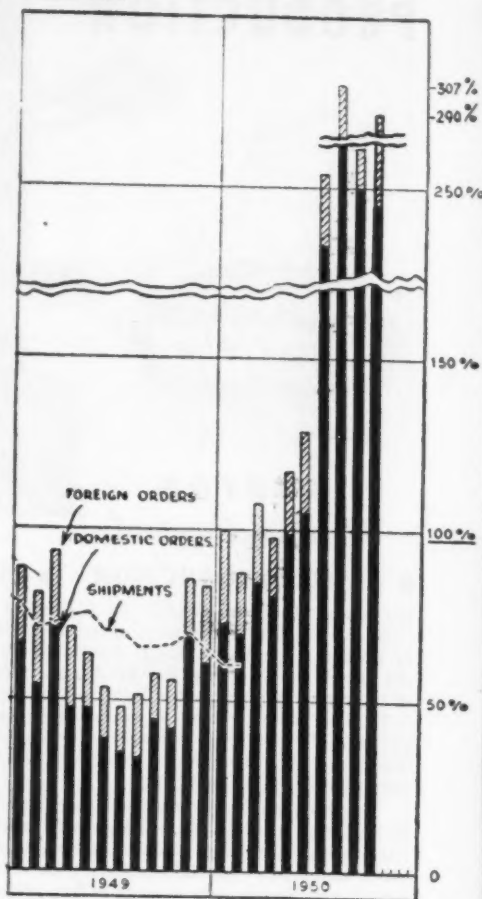
#### Borrow Machine Tools

The Army, Navy and Air Force have about 98,000 units of production equipment on hand in the National Defense Reserve. Of this total about 60,000 are machine tools. If your defense work is being held up through a want of machine tools you may be able to borrow the tools you need from the Army, Navy or Air Force. Tools will come from a pile of "dead reserves", and will not be taken from those tools to which the government holds title and which are now in use.

Subcontractors should apply to the prime contractor, prime contractors contact their contracting officer. You may be able to borrow them outright or get them on lease and pay for their use; this will depend on the kind of contract in force.

Tools are not in A-1 condition. They will have to be brought up to fighting trim; however, the government will pay for getting the tools ready for work. The Navy has done a good job of keeping tools in good shape, the Air Force is the worst, and the Army is merely fair. The Navy has tried to replace all worn parts wherever it is practical, the Air Force merely stacked

**MACHINE TOOL SHIPMENT CHART**  
A quantity comparison between 1949 and 1950



source: Machine Tool Builders' Association

them in warehouses. All motors have been removed by all three services and checked.

The Munitions Board points out that these tools are not available to industry as a permanent addition to their production facilities, but should be considered only as a stop-gap measure until new tools can be obtained by the user from the machine tool builders.

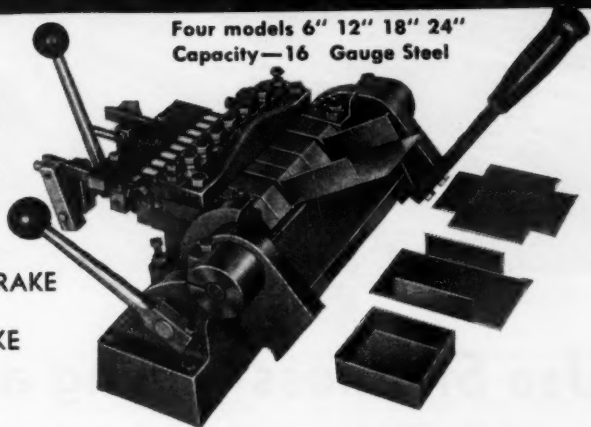


# New! **di-acro** BOX FINGER BRAKE

Four models 6" 12" 18" 24"  
Capacity—16 Gauge Steel

## 3 TOOLS IN ONE

- 1 BOX and PAN BRAKE
- 2 STANDARD BRAKE
- 3 BAR FOLDER



**Versatility from the word GO!!** One box or 10,000—can be economically produced with the new Di-Acro Box Finger Brake. The complete box finger bar also serves perfectly for all standard brake operations. An Acute Angle Bar—quickly mounted—converts the brake to a bar folder for locks, seams, hems and sharp angles. The unique Di-Acro Open End Finger forms square or triangular tubes and other similar parts difficult to make.

Real machine tool construction, with hardened and precision ground box fingers, assures permanent accuracy in producing duplicated parts. The Box Finger Bar can be easily mounted on all standard Di-Acro Brakes.



### OPEN END FINGER

for forming triangular, square and rectangular tubes.

### Send for 40 PAGE CATALOG

describing DI-ACRO Shears, Punches, Benders, Brakes, Notchers and Rod Parters,—also Power Shears and Benders.



Di-Acro is pronounced "DIE-ACK-RO"



## O'NEIL-IRWIN MFG. CO.

314 EIGHTH AVENUE, LAKE CITY, MINN.



## Use Stainless Tubing and Pipe?

### Call Ryerson for Quick Shipment

The country's largest stocks of stainless tubing and pipe await your call at Ryerson. On hand for immediate delivery are nineteen distinct kinds — both seamless and welded — in a wide range of sizes. Our stocks also include stainless pipe fittings and fastenings for every requirement.

The stainless tubing and pipe you get from Ryerson is of highest quality and meets the exacting requirements of ASTM Specs. You can count on its size accuracy and scale-free finish. You can form and weld it readily, thread it accurately. And when you call Ryerson, America's pioneer warehouse distributor of stainless, you put 25 years of practical stainless experience to work for you.

Ryerson protects the high quality of all stainless tubing and pipe stocks by expert handling. Our facilities include modern equipment to cut your stainless exactly

to order and deliver it promptly. So, for complete stainless service, call your nearby Ryerson Plant.

#### STAINLESS TUBING AND PIPE IN STOCK

TP304 TUBING	Seamless & Welded
TP316 TUBING	Welded
TP304 PIPE	Schedule 5—Light Wall—Welded
	Schedule 10—Light Wall—Seamless & Welded
	Schedule 40—Standard Weight—Seamless & Welded
	Schedule 80—Extra Heavy Weight—Seamless
TP316 PIPE	Schedule 5—Light Wall—Welded
	Schedule 10—Light Wall—Welded
	Schedule 40—Standard Weight—Seamless & Welded
TP347 Pipe and/or 304 ELC	Schedule 5—Light Wall—Welded
	Schedule 10—Light Wall—Seamless & Welded
	Schedule 40—Standard Weight—Seamless & Welded
	Schedule 80—Extra Heavy Weight—Seamless
STAINLESS FITTINGS & FASTENINGS—Screwed and welding pipe fittings, welding spuds, valves, bolts, screws, washers, etc.	
Also Stainless, Alloy & Carbon Steels—Bars, Structural, Plates, Sheets, etc.	

## RYERSON STEEL

JOSEPH T. RYERSON & SON, INC. PLANTS AT NEW YORK • BOSTON • PHILADELPHIA • CINCINNATI  
CLEVELAND • DETROIT • PITTSBURGH • BUFFALO • CHICAGO • MILWAUKEE • ST. LOUIS • LOS ANGELES  
SAN FRANCISCO

# Difficult Clevis Job Milled....

# 3

## TIMES FASTER WITH INSERTED CARBIDES

BY JACK HUNTER,

GENERAL SHOP SUPERINTENDENT, OIL TOOL DIV., BYRON JACKSON CO.  
LOS ANGELES

The need for better machinery and machining practice for competing successfully was seen clearly several years ago when plans were laid for the development of high production tools to be used in the various BJ divisions. The program was simple: (a) each manufacturing operation was studied to see if a cost reduction was possible; (b) we endeavored to solve, engineering-wise, the problems we turned up; (c) actual developmental work was carried on in the shops until perfected new methods were in use under a schedule of full production operation.

Possibly the most spectacular development was the result of years of work in testing applications of carbide bits in the machining of steel parts. Our latest step towards increasing production by using carbide bits is our new procedure for milling double-ended clevises from rough rectangular forgings.

These clevises are an integral part of the BJ 200-ton electronic weight indicators. The weight indicator permits the driller to know at all times the weight on the bit as it rotates. To-

day's deeper drilling demands sensitive readings to prevent costly "down-time" in oil well drilling operations. As accuracy is the paramount factor, each part, including the clevis, must be milled to exact tolerances.

Formerly we milled slots in these 10¼-in. sq. x 47-in. long SAE 4142 forgings with HSS slab mills. The slots were 6 x 10¼ x 25 in. at one end; 6 x 10¼ x 16 in. at the other end.

Milling time per piece was approximately 24 hrs.;

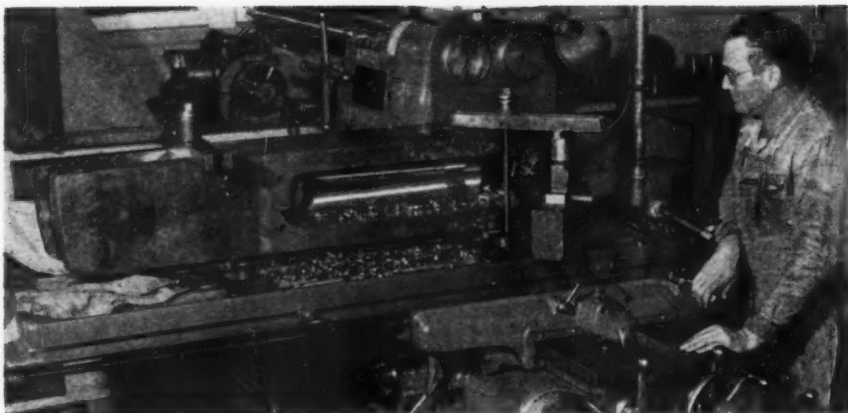
The cutter was 6 in. in diameter x 6 in. long;

The rpm rate of the job was 27;

SFM rate was 42;

Feed rate was .25 IPM.

Research on this operation established that a material increase in production rates could be accomplished by the use of carbide bits, providing that a suitable inserted carbide cutter could be developed to cut the job. Byron Jackson Co. engineers designed a 4½-in. diameter inserted carbide face mill cutter to be used with a 15-hp Milwaukee horizontal knee type milling machine.



1. Carbide milling of double-end clevises on 15 HP horizontal, knee-type milling machine with 4½" dia. inserted tooth milling cutter, with solid inserted carbides, mechanically held.

• • •

To turn out a better finished product, our engineers specified that heat-treated alloy steel forgings must be used. Carbide milling thus became mandatory.

In order to record the hp needed (our machinery was not designed originally for carbide milling, with its necessarily higher hp demands), we installed a watt meter on the milling machine and ran extensive tests using various types of cutters and carbides. This work was done under the direction of Bill Burstall, our assistant superintendent.

From the information gained we drew conclusions as to the exact type of cutter necessary for the individual job. We engineered, designed, and fabricated the cutters we needed, which then were not available on the open market.

The clevis job referred to was a particularly difficult one to handle. Previously the slab mill had been started at .25 IPM feed, but it became necessary to change to hand feed, as the

hardness of the material and the pressure combined to spring the cutter from the work. The spirally-fluted slab mill also caught chips which had to be removed from time to time, with consequent downtime increase.

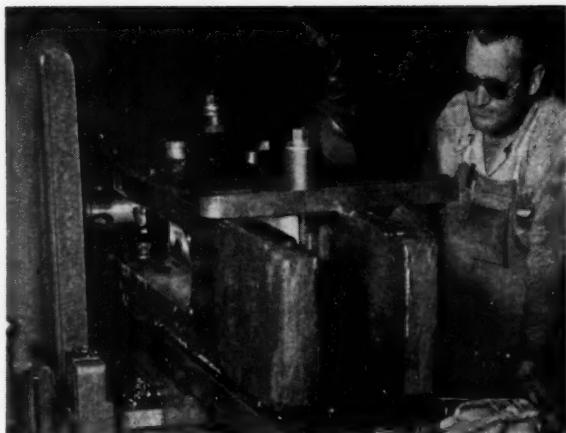
To complete the short slot it was necessary to regrind the cutter five times. The long slot required seven regrindings. This 24-hr. process has now been cut to 8 hrs., during which time 700 lb. of metal are removed.

Blades for the cutter are Kennametal Standard K3H, style MA6, which made it possible for the operation speed to be advanced from 27 rpm to 264 rpm. These blades are held by tapered steel wedges. Actual placing of the bit in relation to the work was accomplished by our team at Byron Jackson Co., aided by J. F. Liebscher of the Kennametal organization, who worked with us in devising a satisfactory setup. A good deal of experimentation and comparison of results gave us our present cutting angle, "the secret" of economical carbide milling.

• • •

2. The milling operation of the clevises produced a 700 lb. pile of chips in an eight hour run. The cutter design permits sharpened blades to be inserted in the cutter body without removal from the machine.

• • •



We should note in this respect that the design of the cutter permits sharpened blades to be inserted without excessive delay and at consequently less expense. One of our tests shows that after three hours of cutting, an examination of the blades revealed a wear land of less than .015 in. on the periphery.

Other operational data of interest is the current feed rate, which is 10.5 IPM, with a chip load factor of .008 in. The individual pass is  $\frac{3}{8} \times 4\frac{1}{2} \times 25$  in. An unavoidable overhang of 7 in. beyond the machine's spindle nose is required by the nature of the job, but

this situation has not affected the efficiency of the operation in any way.

The End

#### DO YOU HAVE A REPLACEMENT FORMULA?

You will be interested in the special report number 8 discussing the MAPI Replacement Formula which was published in the January issue of the MACHINE and TOOL BLUE BOOK. Reprints are available from the MACHINE and TOOL BLUE BOOK, 222 E. Willow Ave., Wheaton, Ill.



#### "ETALON"

Swiss High Precision Tools; Calipers, Micrometers, Dial Indicators  
Universal Protractors, etc.

Manufactured by the famous Tool Makers, R. Roch, Ltd.

**ALINA CORPORATION**

32 Broadway  
New York 4, N.Y.

Exclusive Representatives  
Whitehall 4-4088

## Chuckling Machines, Turret Lathes, Hand Screw Machines....Part 1

This is the ninth in a monthly series of special reports discussing various types of machine tools. Included in this month's report on Chuckling Machines, Turret Lathes and Hand Screw Machines are:

1. thoughts on the efficient use of chuckling machines,
2. descriptions of late model chuckling machines, turret lathes, and hand screw machines
3. specifications of American-built machines

The eight previously published reports discussed: 1. Thread Rolling; 2. Power Press Brakes; 3, 4, 5, Milling Machines; 6. Honing, Lapping, Superfinishing; 7. Automatic Screw Machines; 8. MAPI Replacement Formula.

### Part 1 Some Thoughts on the Efficient Use of Chuckling Machines

Material and drawings through courtesy of New Britain Mach. Co., New Britain-Gridley Div., New Britain, Conn.

The automatic multiple spindle chuckling machine is essentially a converted multiple spindle automatic bar machine, the difference being in the fact that the chuckling machine holds the work in two, three or four jaw chucks instead of in collets and works on castings or forged steel parts instead of bar stock. In fact, the original multiple spindle

chuckling machines were built on a screw machine frame and were from all outward appearances just the same as screw machines. It wasn't until the open-end chuckling machine was built with the Gridley type turret that work rotating chuckers took on an appearance of their own.

The reasons for setting up a job on an automatic chuckling machine are much the same as the reasons for using a bar machine. Fundamentally, these machines take up where the turret lathe

**Note:** The concluding part of this special report dealing with Turret Lathes and Hand Screw Machines will appear in the next issue of the MACHINE and TOOL BLUE BOOK.



# For the FINEST Tools...

## *Specify*



**TOOLS... BLANKS... WEAR PARTS... DIES...**

### TELEPHONES: FACTORY and BRANCHES

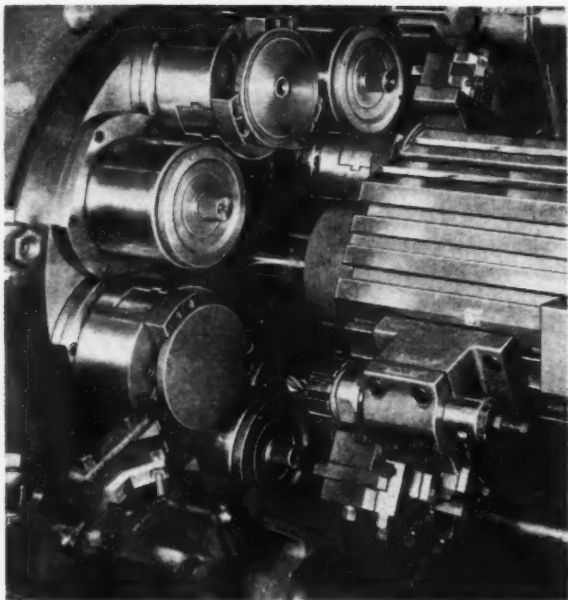
BALTIMORE Plaza 3-200	CINCINNATI Redwood 2553	DETROIT University 4-6400	LOS ANGELES Richmond 4682	PEORIA Enterprise 3131	SAN FRANCISCO Yukon 6-6503
BIRMINGHAM 4-3611	CLEVELAND Cherry 1-0227	FORT WAYNE Anthony 4431	LOUISVILLE Taylor 5960	PHILADELPHIA Gladstone 5-0500	SCRANTON Enterprise 1-0551
BOSTON Dedover 2-2332	DALLAS Riverside 5138	HARTFORD 32-5197	MILWAUKEE Division 2-0204	PITTSBURGH Hiland 1-8548	SEATTLE Ellison 0052
BUFFALO Delaware 7634	DAVENPORT 7-9544	HOUSTON Wayside 1530	MINNEAPOLIS Bridgeport 2792	READING Enterprise 1-0551	SYRACUSE 3-0334
CHICAGO Ambassador 2-1000	DENVER Taber 0444	INDIANAPOLIS Riley 3946	NEWARK Mitchell 2-8532	ROCKFORD Enterprise 2504	WAUKEGAN Ontario 5230
		KANSAS CITY Baltimore 1700	NEW YORK Flushing 3-0027	ST. LOUIS Hawsted 3110	



#### EXAMPLE No. 1

Type bar segments were formerly machined by six operators on four turret lathes, and one special grooving machine. When the part was placed on an eight-spindle chucking machine labor costs were reduced 85% and production increased from 90 to 120 pieces per hour.

The material is cast iron. With the machine arranged for double index both sides of the piece are machined simultaneously. In the 2nd, 4th and 8th positions the flat side is faced, the hub formed, the wire grooves trepanned, and the hole drilled and reamed. In positions



3, 5 and 7 the various diameters of the contoured side are formed and faced and the O.D. of the piece is turned.

Tolerances were held under .001".

leaves off. Their main advantage is on high production runs where the set-ups do not have to be changed too often. Obviously, the fact that all tools in successive stations are working simultaneously on the piece makes the production on these machines quite a bit higher than that obtained from a single turret lathe where the tools operate in sequence, one after the other.

Thus a job, which on the turret lathe would have four or five separate operations lasting anywhere from a few seconds up to a couple of minutes each, would take much longer than on the chucking machine where the total time of the job is governed by the longest operation. Another advantage which is similar to the automatic bar machine

is the fact that this one longest operation can be broken down into two or three successive steps because of the multiple spindles and thereby shorten the time of doing the job. This cannot be done on the turret lathe where only one set of tools can be working on the piece at a time.

A chucking machine set-up and tool layout is very similar to that of an automatic bar machine in that the work is rotated in the spindles which are housed in an indexing spindle carrier. The tools are fed in by the longitudinal end-working slide and the cross slides. Figuring tooling for an automatic chucking machine is much the same as laying out tools for an automatic bar machine with two major ex-

## EXAMPLE No. 2

This cast iron distributor was previously machined on a battery of lathes. The job was set up on a multiple spindle chucking machine. Concentricity of the hole between the bowl and shank ends is limited to .005". This was maintained by the use of hydraulically operated hook bolt fixtures and drill guide in the 6th position. The shaft is  $9\frac{3}{16}$ " long.

1st Pos. — Load

2nd Pos. — Rough turn O.D. of shaft half way. Chamfer end of shaft. Drill part way.

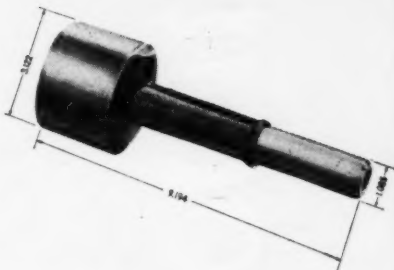
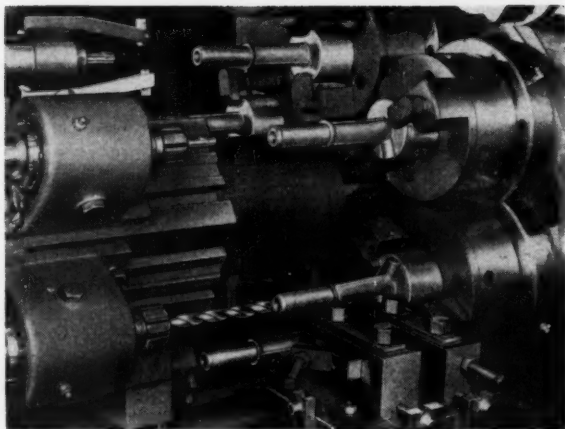
3rd Pos. — Rough turn remainder of shaft O.D. Face end of shaft. Drill to shoulder (drill speeder).

4th Pos. — Cross face shoulder and cut relief. Finish face end of shaft.

5th Pos. — Bore for bushing (drill speeder).

6th Pos. — Finish turn. Ream out bore.

Production was 19.4 seconds per piece.



ceptions. The majority of the parts are made of castings or forgings which are machined at different surface speeds from the ordinary bar stock used in screw machines, and the pieces are much larger in diameter in most cases which necessitates a slower spindle speed to get the proper S.F.M. for the turning operations being done on the O.D. of the piece.

Fundamentals known to every screw machine tooling man can be applied to the chucking machine. These consist of beginning the tooling layout by figuring the operation which will take the longest time and breaking this operation down into as many positions as possible, spreading the tooling through-

out the number of available spindles to lessen the work of each spindle and increase tool life, and by adding special attachments to the machine where possible to eliminate second operations. The use of these fundamentals will help the tooling engineer get the most out of the automatic chucking machine but it cannot be stressed too strongly that the different combinations of tooling should be considered before a final decision is made, for in many cases the sequence of operations and the tools applied in each position can be changed around so that the time of the job will be shortened. Many times this is not immediately apparent to the tool engineer and he must therefore do a little

Announcing



NEW BRITAIN



## **... the addition of a new double-ender to our regular line of precision boring machines**

This new double-ender rounds out our established group of precision boring machines and permits us to offer a complete line. The Model 50 is equipped with our exclusive New Britain high speed boring spindles. The hydraulic system is a completely separate unit which can be easily disconnected for cleaning and servicing.

Tooling set-ups and types of pieces machined depend entirely upon the

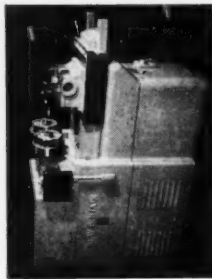
**AUTOMATIC BAR AND CHUCKING MACHINES • PRECISION BORING MACHINES  
LUCAS HORIZONTAL BORING, DRILLING AND MILLING MACHINES**

ingenuity of the production engineer. For this reason we invite your inquiries on this kind of work and offer our complete estimating experience to help you tool up for profitable production.

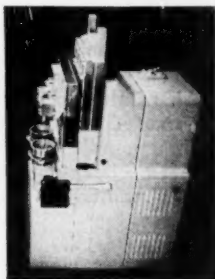
# **NEW BRITAIN**

## *Automatics*

**THE NEW BRITAIN MACHINE COMPANY  
NEW BRITAIN-GRIDLEY MACHINE DIVISION  
NEW BRITAIN, CONNECTICUT**



**Model 26 & 27 Straight Boring Machine for precision finishing operations on a wide range of work.**



**Model 36 & 37 Straight and Contour Boring Machine, single point bores, turns, faces, contours, and positively repeats with extreme accuracy.**

### EXAMPLE No. 3

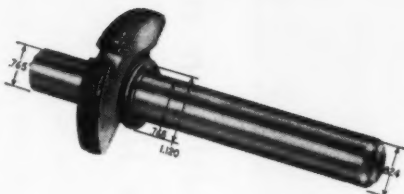
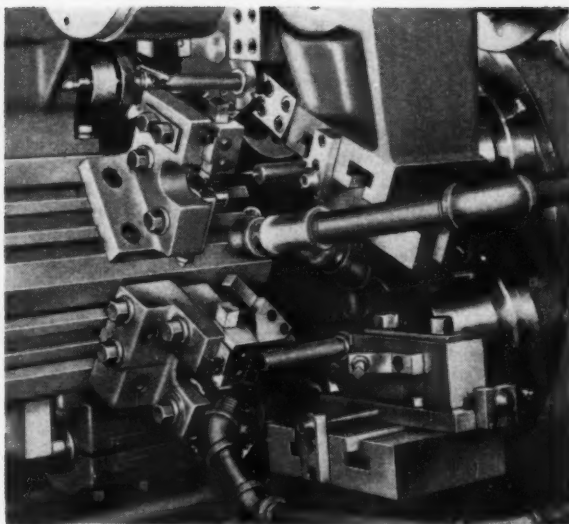
A six-spindle automatic chucking machine was used to produce the large steel crankshafts shown. The short eccentric end is finished in the first operation. The second operation machined the long end.

#### 1st OPERATION

- 1st Pos. — Load, short end out.
- 2nd Pos. — Face both sides of counterweight. Hollow mill .765" dia. half way.
- 3rd Pos. — Hollow mill .765" dia. remainder.
- 4th Pos. — Spot for drill. Chamfer end. Form undercut. Rough face end of .765" dia.
- 5th Pos. — Finish turn .765" dia. Drill for tap.
- 6th Pos. — Counterbore. Finish face end.

#### 2nd OPERATION

- 1st Pos. — Load, long end out.
- 2nd Pos. — Hollow mill .824" dia. half way.
- 3rd Pos. — Hollow mill .824" remainder.
- 4th Pos. — Face side of 1.120" dia. Turn 1.120" dia. Rough face end.



- 5th Pos. — Neck .765" dia. Finish face and chamfer end.
- 6th Pos. — Accelerate turn .824" dia.
- Production — 133 pieces per hour.

juggling and use his own ingenuity to place the tools so that the piece will be made in the shortest possible time.

### Types of Chuckers

Fundamentally, multiple spindle automatic chucking machines are broken down into three different types: 1. open-end work rotating chucking machines which rotate the work piece in a chuck held in a spindle; 2. closed-end work rotating chucking machines, which have the additional benefit of

having a power case on the right hand or tail stock end of the machine which is utilized for driving drill speeders and actuating accelerated attachments, (the open-end work rotating type of chucking machine can also be equipped with power unit on the tail stock end of the machine which drives drill speeder spindles but since the open-end chucking machine is used mostly on jobs which require no fast drilling or threading operations, this attachment is only provided where the job requires it); 3.



# A GREAT NEW POWER BLADE

with

## GREATER SAFETY

Shatterproof, Extra Strong Body,  
Practically Unbreakable

## GREATER PRODUCTIVITY

High Speed Steel Welded Edge  
for More, Straighter  
Cuts Per Blade



## Starrett® SAFE-FLEX® HIGH SPEED WELDED-EDGE POWER HACKSAW BLADES

This great, new hacksaw blade gives you all the features you've always wanted for power cutting — a completely safe, shatterproof, extra tough body combined with a high speed steel cutting edge that makes it the safest, straightest cutting, most durable blade you've ever tried.

"DOUBLE WELDED STEEL CONSTRUCTION", an entirely new development in blade design, backs up the performance of this outstanding blade. Its hard, high speed steel cutting edge is integrally welded to a medium hard, extra strong steel center also welded to a super tough steel back. Result is a far stronger blade with a perfect balance between hardness and toughness that makes the Starrett SAFE-FLEX cut straighter, completely shatterproof and ideal for heavy feeds and rugged jobs such as interrupted cuts and sawing multiple work.

Let your safety engineer prove it for himself. Order some Starrett SAFE-FLEX Welded Edge Power Blades today.

### SHATTERPROOF DOUBLE-WELDED STEEL INSURES SAFER, STRAIGHTER CUTTING



Super-Tough Steel  
Back For Extra Tough-  
ness

Medium-Hard Steel  
Center For Extra  
Strength

Hard "High Speed"  
Edge For High Produc-  
tion Cutting, Heavy  
H. S. Edge — No Tooth  
Stripping

There's a Starrett Blade for Every Job — S-M Molybdenum, High Speed Tungsten 18-4-1,  
Safe-Flex, Standard — Hand and Power Sizes

# Starrett

## Standard of Precision

### BUY THROUGH YOUR DISTRIBUTOR

Mechanics' Hand Measuring Tools and Precision Instruments  
Dial Indicators • Steel Tapes • Precision Ground Flat Stock  
Hackaws, Band Saws and Band Knives



THE L. S. STARRETT CO. • World's Greatest Toolmakers • ATHOL, MASSACHUSETTS • U. S. A.

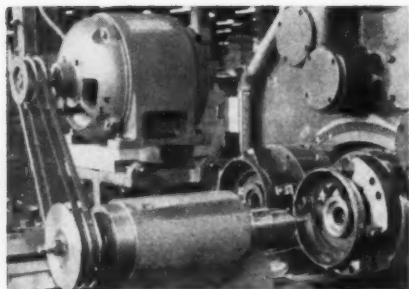


Fig. 1. Special attachment of a precision boring spindle, motor driven, mounted on the end-working slide for precision boring the shaft hole of a motor end frame.

• • •

the tool rotating chucking machine, in which the work is held in a chuck which is mounted on an indexing turret and the tools are fed into the work. The two main advantages of this type of chucking machine are that it is capable of producing many multi-sided pieces or pieces which are not concentric or which have irregular shapes which would be difficult to chuck and revolve in a work rotating type of machine; further, spindles can be fed into the work. The advantage here is of course that a light spindle can be rapidly fed into the work piece. The threading spindle on this type of machine is very fast and is a contributing factor to the high production of the machine. These tool rotating chucking machines are used mostly on fast brass and aluminum jobs.

### Standard Operations

Because many pieces machined on the chucking machine are cast iron and the majority of them do not require any drilling from solid stock, carbide tipped tools are used to a great extent with an accompanying increase in production. Although there are many different types of attachments and special tools which can be applied to the chuck-

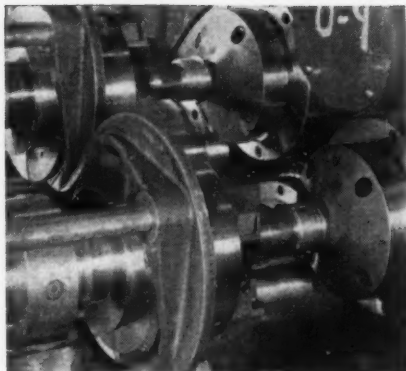


Fig. 2. Two self-opening die heads in the fifth position on an open-end chucking machine. Large yokes trip die head when bottom of thread is reached.

• • •

ing machine, the standard kinds of operations which can be done run a close parallel with the automatic bar machine. From the end-working tool slide or turret, we can turn, drill, plunge cut, bore with a boring head or single point boring tool, tap, thread, ream, chamfer, recess and taper turn. From the cross slide we can face, form, groove, chamfer, and cut off.

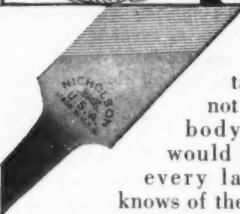
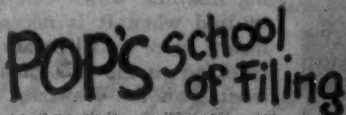
### Attachments

Many additional kinds of tools and attachments can be applied to the chucker and the number and design of these depends on the ingenuity of the tooling engineer. On the open-ended chucker these accessories are

• • •

Fig. 3. Application of a work inserter and spotting spindle in the loading position. This attachment saves a working position and makes the loading position available for one more operation—that of spotting.

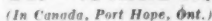




It's the Nicholson Long Angle Lathe File (also made in Black Diamond brand). It has less tendency to fill, be-

Made in Flat type with "Long Angle" stamped on tang; and sold through industrial supply houses. Unsurpassed Nicholson quality, of course.

**FREE TECHNICAL BULLETIN, "10 Special File Types."** Also "File Philosophy," Nicholson's famous 48-page illustrated book on kinds, use and care of files. *Free*—as many copies as you need for purchasing and production heads.



# NICHOLSON FILES FOR EVERY PURPOSE

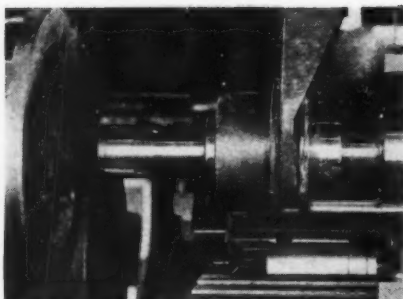


Fig. 4. Tapping spindle on open-end chucking machine.

driven by an auxiliary multiple power unit which fits on the end of the main tool slide. On the closed-end chucker, the power case contains the drive for these attachments. The more common types of attachments include drill speeders, multiple drill heads, recessing attachments and taps and die heads. For more specialized types of pieces second operations are performed by special attachments such as taper and elliptical turning attachments, bushing inserters, precision boring spindles and even sanding belts. Some of these special attachments are illustrated in figures 1, 2, 3, 4, 5, and 6.

Fig. 5. Multiple drill head mounted on the main tool slide. Drill head revolves at the same speed and in same direction as work spindle. Drills are rotated by gearing inside head and are fed into the work by feed of main tool slide.



One feature on the open-end chucking machine which can be sometimes utilized when it is necessary to back face a piece or when an oil groove is specified on the O.D. of a shaft, is the feeding on the drawback advantage of the machine. Some pieces have been tooled so that the tools are fed on the drawback of the main turret instead of on the normal feed-in stroke. This is sometimes done when it is difficult to hold the piece with the working por-

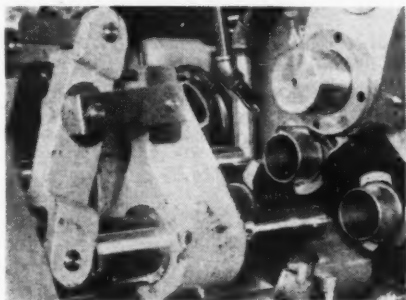


Fig. 6. Special Accelerating Attachment. Hold back bracket stops top of lever. Forward action of main tool slide transmitted through the boring bar spindle mounting and linkage to lever accelerates motion of boring spindle to a faster feed per revolution than that of the main tool slide.

tion out such as with an automotive piston. The piece is chucked up with the surface to be worked on facing in toward the chucks and the tools are mounted on the main tool slide so that they work on the back of the piece and are fed on the drawback.

### Feeds

All motions of the automatic chucking machine are accomplished by either drum or disc type cams—the drum type cam being used for the main turret feed and the disc type for the cross slide feed. In the open-ended chucker, two types of cross slides are

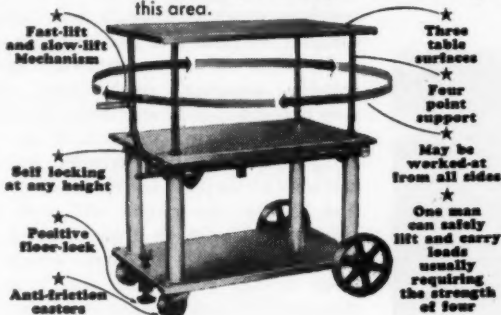
# Cut the costs

## THAT COLLECT

## TWO FEET ABOVE THE FLOOR



Watch, for a while, the heavy loads that are moved, elevated, and lowered in the horizontal space between 24" and 42" above the floor. Watch the stock feeding operations, the placement and removal of dies and fixtures, the assemblies and repairs which take place daily within this area.



How efficiently and safely are these operations performed in **YOUR** plant? Would increased efficiency here tend to reduce unit costs? Industrial injuries?

PORTELVATOR® the Handy Hamilton Portable Elevating Table, is height adjustable within this vital area, and rolls smoothly in a horizontal plane on anti-friction casters and wheels.



## STRONG AS AN ELEPHANT



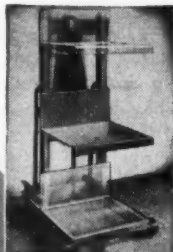
## COMPACT AS A PONY

Three standard table models with capacities of 1,000 to 5,000 pounds. Hundreds of special models now performing out-size or unusual jobs in the country's most progressive plants. Our new Portellevator Bulletin, which gives full specifications and points out many uses, may be had free.

WRITE FOR IT!

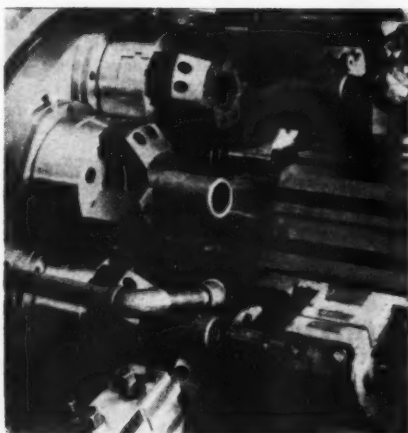
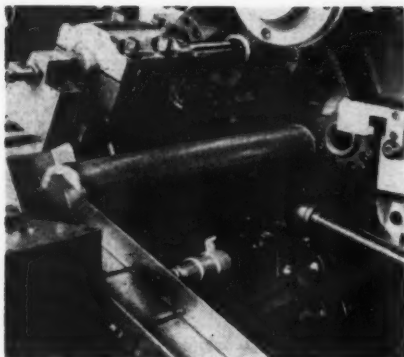
## PORTELVATOR® STACKER

For extra high and extra low operations. Capacity 1,000 pounds. Platform travel from 6" to 58" above floor level. Manually operated.



THE  
**Hamilton**  
TOOL COMPANY

826 SO. NINTH STREET • HAMILTON • OHIO • U • S • A



**Fig. 7.** Set-up for machining two pieces at once on an 8 spindle open-end chucker with double index feature. First piece is finished in odd numbered stations and then turned around and chucked up with the finished piece in the chuck and the unfinished piece extended. The second piece, after being finished in the second and fourth spindle, is cut off and forced through the pick-off tube from which it drops into the chute and into the work pan. Previously, piece is removed from the chuck when the machine indexes over into the loading position.

available, one is the so-called swinging type forming arm which feeds the tool in on a radius and is illustrated in figure 7, and the flat type cross slide which is similar to that used on an automatic bar machine, figure 8. In the closed-end chucking machine flat cross slides are used. The tool rotating machines have no cross slides as most of the work is done from end-working tools. If there is any cross operation to be performed on the piece, it is generally done with a cross feed head.

### Special Features

Some of the features of the chucking machine which contribute to better production methods and permit more work to be done on one machine are special spindle stopping mechanisms which stop the spindles in any desired position for cross working tools such as cross drills or cross milling cutters. Spindles can also be stopped in the loading position so that the chuck will stop at a specified place each time. This is extremely valuable in cases where the piece is not concentric and must be chucked up and located on a locating lug. This enables the operator to put the piece in the chuck without first rotating the chuck by hand to find the right position. On the open-end type chucking machine a special swinging type forming arm is available which has motion both longitudinally and across. This type forming arm permits taper or elliptical turning and also can be used for recessing, inner grooving, back facing or back chamfering. Open-end chucking machines are also provided with variable chucking pressures in the last positions when thin walled pieces are being machined. Chucking pressures can be decreased in these last positions so that the piece will not be distorted when gripped by the chuck jaws.

### Chucks

There are many different ways of



# SANFORD

## SURFACE GRINDER

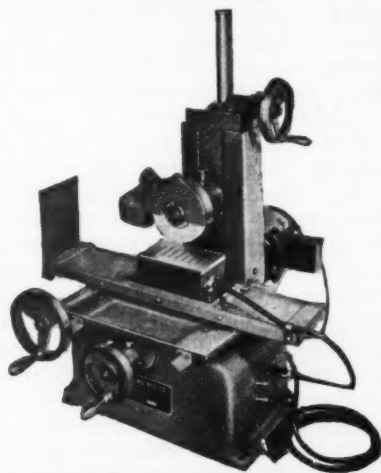
### IF IT FITS

Model SG

IN THE PALM OF YOUR  
HAND

GRIND IT ON THE

SANFORD



The capacity of this sensitive, highly accurate, Bench Model is 4" transverse—8" longitudinal—6" vertical under 4" Wheel. Meehanite Castings and a very sturdy construction assure long life, vibrationless operation and finishes to micro-inches.

Write for complete details.

SANFORD MANUFACTURING CO.  
1030-20 COMMERCIAL AVENUE  
UNION, NEW JERSEY

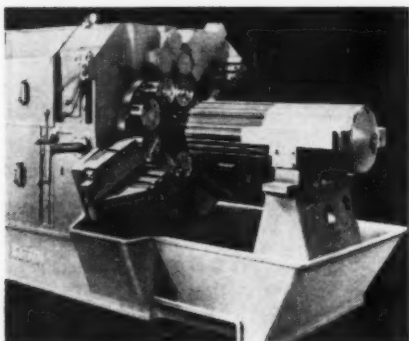


Fig. 8. Model 98. Multiple spindle automatic work rotating chucking machine with flat cross slides. Additional forming arms can be attached in the openings which are now covered by circular covers at the top of the machine. Note extremely wide open and accessible tooling area which is one of the advantages of the open-end chucking machine.

• • •

holding pieces in the automatic chucking machine. Generally three or four jaw chucks are used which grip the piece on an outside locating diameter, figure 9. However, on some pieces, expanding type jaws are used which grip the piece on an inner locating diameter. Some special pieces which are not concentric can be held in a special false jaw which can be made up to grip the contour of the piece.

In some cases eccentric chucks are used where diameters eccentric to the center line of the piece must be turned—such as in a throw for a crank shaft. Many types of loading rams and fixtures can be devised for hand loading or automatically loading heavy pieces or pieces difficult to handle.

### Double Indexing

One of the main advantages of the multiple spindle chucking machine is in the feature which is known as double indexing in which the machine is tooled so that both sides of a part are ma-

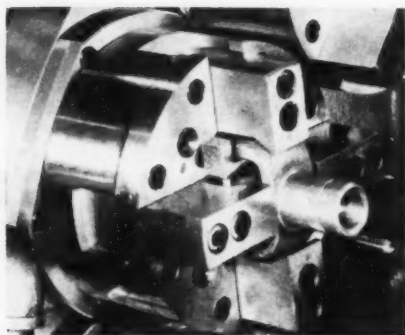
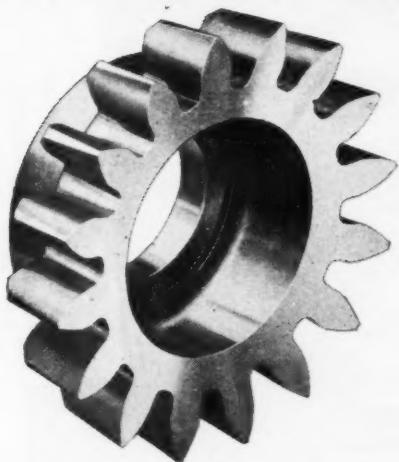


Fig. 9. Illustration of steel forging being held in four-jaw chuck.

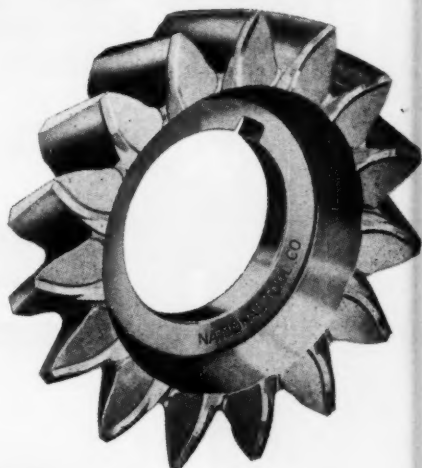
• • •

chined in one operation. Figure 7 shows a typical application of this method of tooling. The theory is to use the uneven numbered stations to machine one side of the part and then to use the even numbered stations to finish the opposite side of the part. This process in reality makes two four-spindle chucks out of one eight-spindle machine. The blank is loaded in the number one position and indexes through two stations to the number three position where rough work is done. It then indexes into the number five position, then to number seven where the part is finished on one side and then back into number one. When the piece gets to the first position, the operator unloads it, reverses it and chucks it up in the number two position. The piece then indexes into number four where roughing is done on the second side and thence to number six and number eight where the piece is finished. The operator removes the finished piece when it indexes into position number eight. This double index feature of the multiple spindle automatic accounts for a great deal of second operation eliminating and is one of its main cost saving features.

For those tough *Special* jobs that  
just have to be right...depend on  
**NATIONAL TOOL CO.**



**GEAR SHAPER CUTTER and  
HERRINGBONE GEAR CUTTER**  
custom-engineered to  
meet the exacting needs  
of the Gear Industry



*Since 1905* engineers  
and manufacturers of high-  
quality special cutting tools  
for the metal-working industry

A partial list of  
*special* tools  
engineered and  
manufactured by  
National Tool Company

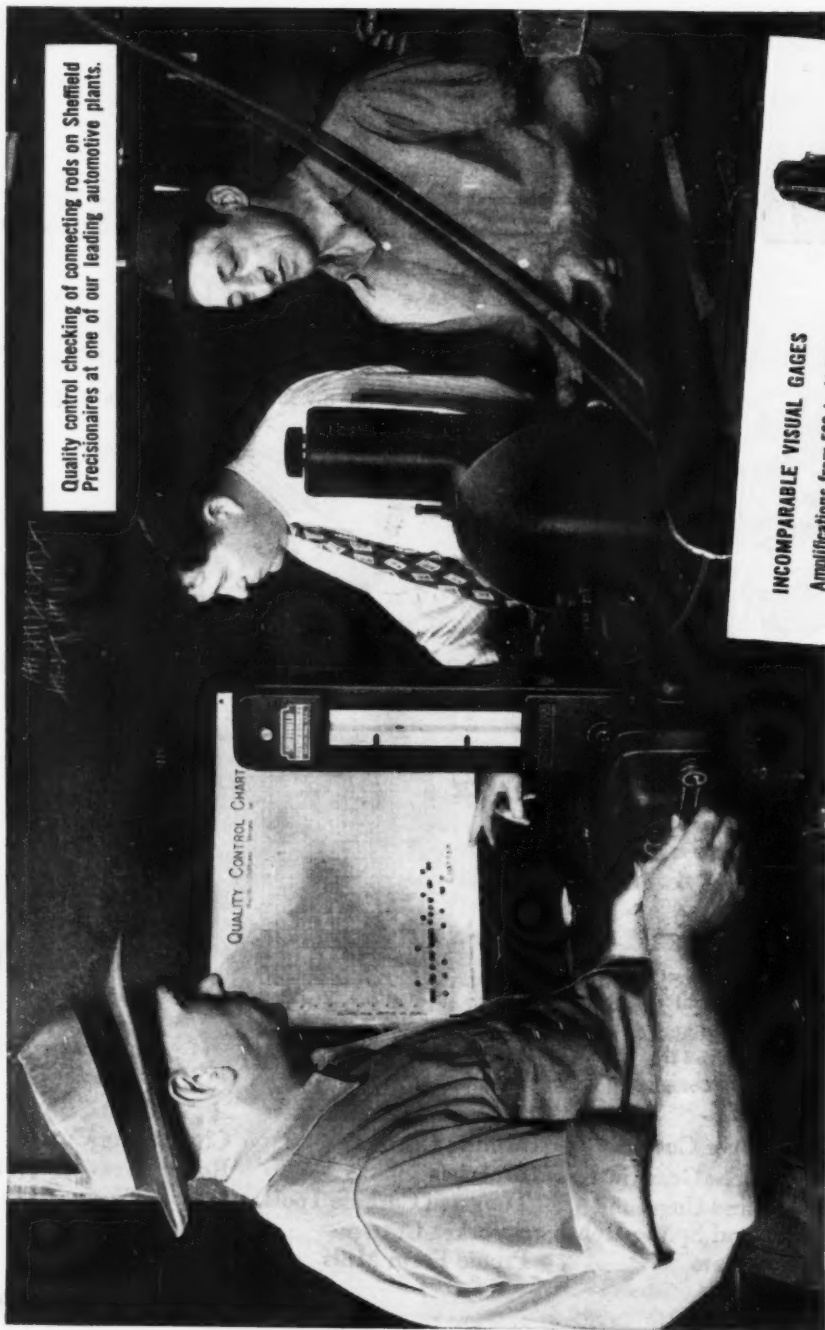


Representatives  
in major  
industrial centers

↓  
Gear Shaper Cutters  
Herringbone Gear Cutters  
Ground and Unground  
Gear and Spline Hobs  
Master Gears

Milling Cutters  
Broaches  
Tungsten Carbide Tools  
Sprocket Cutters  
Profile Form Mills

Chamfering Cutters  
Rotary Gear Cutters  
Circular Form Tools  
Gang Cutters  
Flat Form Tools



Quality control checking of connecting rods on Sheffield Precisionaires at one of our leading automotive plants.

#### INCOMPARABLE VISUAL GAGES

Amplifications from 500 to 10,000 to 1 • Infinite variety of anvils, accessories and thread checking equipment • Most durable and trouble-free comparator ever made.



**ONLY THE BEST GAGES**

# ARE GOOD ENOUGH FOR QUALITY CONTROL!

Control charts compare measurements of present product with those of the past. Only the very best gages are good enough to have measured the past—only the very best are good enough for the present. Without truly accurate measurements then and now, quality control is but a myth.

Defects are prevented before they are made when machine operators are provided with the best indicating gages to show them "where they are going." This is just as true in Receiving and Final Inspection—and for spot check and full lot inspections.

You'll find "It's Wise and Thrifty to Specify Sheffield" gages and measuring instruments for your quality control inspection. Because of its world-wide experience, Sheffield has been accepted as headquarters for single and multiple dimension, semi and fully automatic gaging equipment. This wealth of experience is yours to draw upon—no obligation.

Write for catalogs.



the

*Sheffield*

corporation

Dayton 1, Ohio, U. S. A.

GAGES • MEASURING INSTRUMENTS • MACHINE TOOL • CONTRACT SERVICES • THREADING TOOLS



## FAMOUS COLUMN PRECISIONAIRES

1M, 2M, 5M, 10M, 20M, and 40M amplifications • 1, 2, 3, 4, or 5 columns • Greatest linear scale range • An unsurpassed experience in developing internal and external air gaging equipment.

## STURDY DIAL SNAP

This is the workhorse of dial indicator snap gages • Available in 12 models covering 1" to 12" range • Each adjustable for one inch • Used manually or in a stand.



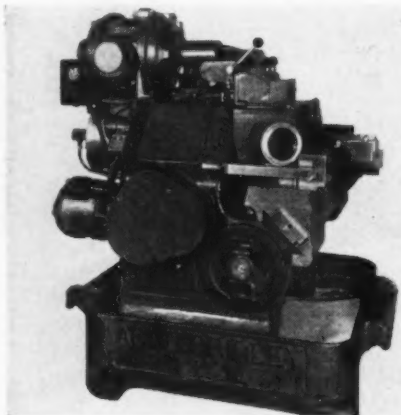
## DEAD-STOP DIAL PRECISIONAIRE

Built to "take it" • Ruggedly withstands abuse • Indicates "on the nose" • Lightning-quick dead-stop indicator action • Advanced type adjustable dial with accurate even-spaced linear scale.

## Part 2 Descriptions of Late Model Chucking Machines, Turret Lathes, Hand Screw Machines.

### National Acme's Chuck-Matic

This 12", single spindle machine, made by the National Acme Co., Cleveland, Ohio, is an air-operated chucking automatic. It is designed primarily for heavy duty, high production on castings, forgings and tubing parts that



require such primary operations as internal straight or taper boring, form boring, form turning, drilling, external turning, forming, facing, chamfering, etc.

The two main slides are of the angular type, mounted directly in the frame without overhang, so that all tool thrusts are received into the frame. Cam drums for the two main slides are mounted on splined shafts driven through bevel gears by the heavy main cam shaft. Cams are changed by pulling out drums on a pilot.

The right-hand slide is a compound slide carrying holders and tools for such operations as straight or taper boring, form boring, form turning, drilling. The action of the lower member, or main slide, is crosswise toward the

spindle; that of the upper slide is inward toward face of the air chuck. The left-hand slide, for forming, facing, chamfering, etc., is operated by cam drum in the same manner as the lower right slide. Positive stops assist in holding fine limits on diameters and lengths.

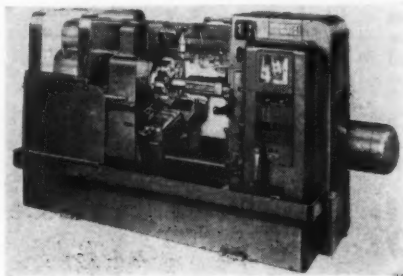
### W & S Automatic Chucking Machine

This six-inch swing machine, made by the Warner & Swasey Co., Cleveland, O., is a five spindle unit. There are no cam changes necessary. The length of feed strokes is mechanically controlled by a patented quadrant linkage combination which eliminates the necessity for interchangeable cams. Simple sliding adjustments require only minutes to make. Cross slide strokes are also controlled by adjustable linkage.

Five air cylinders, for air chucks, working at pressures up to 100 lbs. are provided. Their mechanical leverage affords strong yet sensitive gripping powers on any shape or work.

A wide range of spindle speeds is provided by eight sets of pick-off gears and a high-low shift.

The cross slides have separate micrometer adjustments and a disconnecting arrangement which permits full tool slide action without indexing the spindle.





# MACHINE OF THE MONTH

PREPARED BY THE SENECA FALLS MACHINE CO. "THE Sewing PEOPLE" SENECA FALLS, NEW YORK

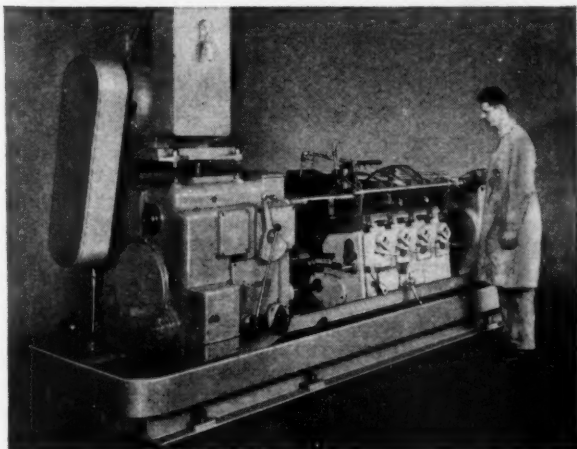
**MODEL "A" So-swing  
LATHE MACHINES  
ELECTRIC MOTOR SHAFTS**

**Problem:** To rough turn, face shoulders and groove electric motor shafts machined in small and medium size quantities.

**Solution:** This new Lo-swing Semi-Automatic Lathe, featuring unlimited length of carriage travel thru rack and balanced twin pinion carriage feed, is ideal for machining short and medium run jobs economically. Unlimited carriage travel permits turning of short run jobs having long shoulder lengths with simplified tooling; multiple tooling may be used for long run jobs with short or long shoulder lengths.

The drawings below show a typical two operation tool setup on electric motor shafts which are being machined in small lots. Only the one tool is being used for turning each diameter regardless of the length of cut.

Machine setup is simplicity itself. First, the tool blocks and tools are mounted on the tool slides in the proper relation to each other and for the proper depth of cut. Secondly, two stops are set for controlling length of carriage travel in both directions and one stop for positioning the carriage in relation to the

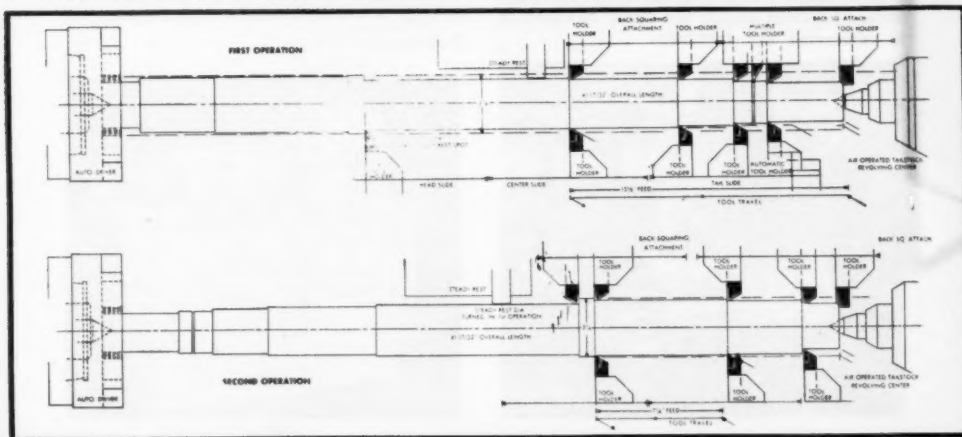


work piece. The lathe is then ready for production.

Tool relief is automatic on the return stroke of the carriage and rapid traverse movements to and from the work are available by throwing a lever.

Investigate the many unique features of this new semi-automatic lathe.

SENECA FALLS MACHINE CO., SENECA FALLS, N. Y.



**PRODUCTION COSTS ARE LOWER WITH Lo-swing**

### Cleveland's Model AB

The Cleveland model AB bar machine, made by The Cleveland Automatic Machine Co., Cincinnati, O., is easily converted into a chucking machine. In figure 1 are shown, at the top

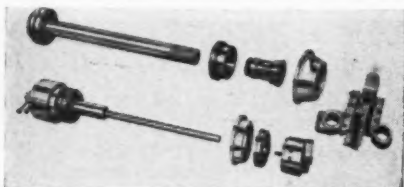
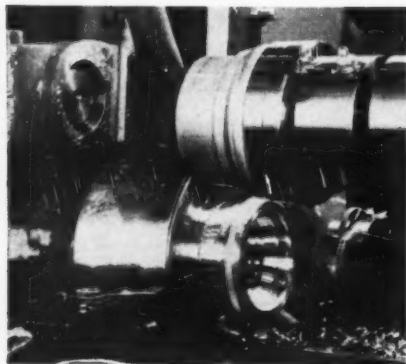


Fig. 1. The bottom parts are the units which must be substituted for the four upper parts to change Cleveland model AB from a bar to a chucking machine.

of the photo, the feed tube, chucking ring, chuck, hood and independent cut-off attachment which must be removed to change from bar to chucking machine. The four parts on the bottom of the photo show the air chuck, full rod, and three-jaw chuck which must be substituted to obtain a chucking machine.

Figure 2 shows a chucking job in the model AB machine. The part is a coup-

Fig. 2. Model AB set up to machine aluminum couplings which are being chucked in a converted bar machine.

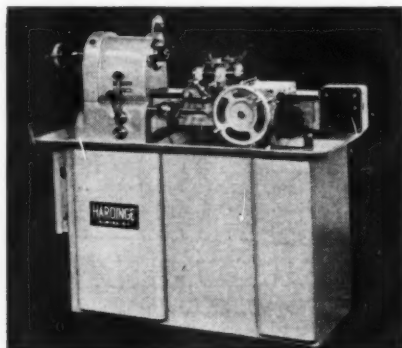


ling machined from an aluminum forging which is fed automatically from a conveyor in the tool turret to the chuck. Production is 53 pieces per hour gross.

### Hardinge Model HC Chucking Machine

The recently developed Model HC Chucking Machine is introduced by Hardinge Brothers, Inc., Elmira, N.Y. It features a full bearing carriage, both on top of the bed and on the dove-tail slides of the bed. Hardened and ground steel dovetail bed ways are provided for the carriage, which is also equipped with independent variable electric feed. An 8-station cross feeding turret and preloaded ball bearing turret and headstock are standard equipment.

This unit features production threading; its rigidity and simplicity of operation permit threading at speeds usually associated with turning operations. Threading is completed without stopping or reversing the machine spindle. The threading head tool holder is adjustable for either left or right hand threads, internal or external, for diameters from  $\frac{1}{2}$ " to 6". The precision master lead screw is mounted directly on the work spindle. The threading tool is moved in unison with the lead of the master lead screw in order to duplicate the accuracy of the lead screw threads on the part.



# PRODUCTION

goes up -----

# SPOILAGE

goes down -----



Exclusive!  
**PROCUNIER**  
"Tap Saver"

The exclusive Procunier "Tru-Grip" tap holder is lighter, smaller in diameter. It affords easier tapping close to walls or shoulders, eliminates "chewed" tap shanks. Holds tap true.

with this Procunier High Speed  
Tap Head

Today you must speed up your production schedules . . . and at the same time reduce spoilage! The Procunier High Speed Tapping Head is precision-built for faster, consistently accurate production tapping. A host of exclusive Procunier features enable you to maintain cleaner, sharper threads . . . with fewer broken taps, fewer spoiled pieces—even on accelerated production runs.

HERE'S WHY: Tap driving pressure is automatically regulated by the amount of pressure applied to the unique Procunier friction clutch. Operators quickly learn to detect dull or "loaded" taps just by the pressure needed to drive them! This increased sensitivity enables even "green" operators to do more accurate tapping. "Blind" hole tapping may be done as easily as through tapping! WRITE TODAY for brochure giving full details and specifications on Procunier High Speed Tap Heads.

Also Available—

New! Procunier "TAP KING" for large hole tapping. Capacity  $\frac{3}{8}$ " to 1" in steel;  $\frac{1}{2}$ " in softer metals.

## Procunier

Safety Chuck Company

14 S. Clinton St.

Chicago 6, Illinois

PROCUNIER SAFETY CHUCK CO.  
14 S. Clinton St., Chicago 6, Ill., Dept. 2

Gentlemen:  
Please send your illustrated brochure giving complete details, specifications and prices on the improved line of Procunier High Speed Tapping Heads.

Name .....  
Address .....  
City..... Zone..... State.....

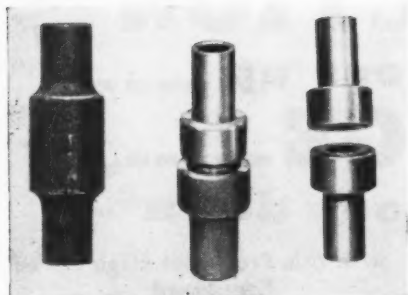


Fig. 1. Three steps in the machining of gear blanks on a converted bar machine. At left the rough casting; next, the first operation; last, second operation.

### Greenlee Six-Spindle Bar Machine Adapted for Chucking

High-speed machining of cast-iron gear blanks is made possible on this Greenlee 1½" bar machine, made by Greenlee Bros. & Co., Rockford, Ill., through a revision of the standard spindle assemblies. This assembly incorporates a chuck mechanism which compensates for the approximately .080" variation in the stock diameter of the work. Special collets, equipped with floating pads, provide accurate alignment and a secure grip on the draft taper of the castings.

Since each casting contains two gear blanks, the entire lot is machined on one end, then turned and finished in a second pass through the machine, when the blanks are separated. No tooling change, except the addition of a cut-off tool, is required to make the second run, although a collet change

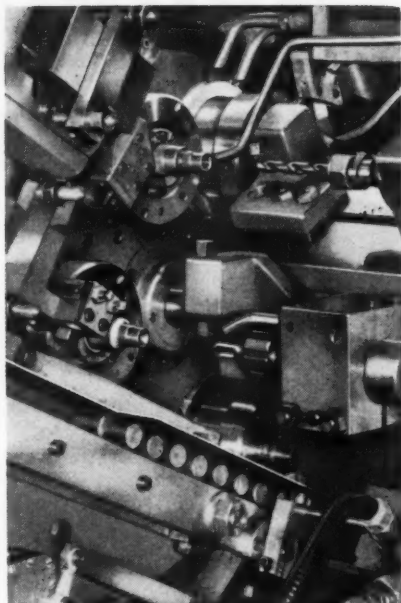


Fig. 2. Second operation of machining gear blanks. Note the automatic hopper feed. This is a six-spindle machine. Special spring-loaded spindles are used for holding the castings.

is necessary because the piece is gripped for this operation on a turned diameter which is considerably smaller than the original diameter of the rough casting.

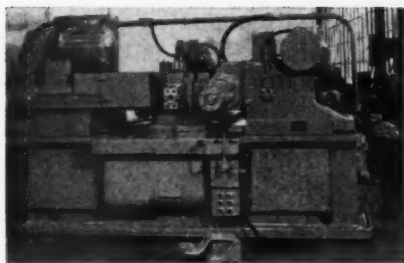
The cycle time of 12½" seconds per piece produces a gross rate of 288 pieces per hour. Blanks are fed into the machine automatically.

### Goss & DeLeeuw "One-Two-Three" Machine

This 7-spindle chucking machine is a recent introduction of The Goss & DeLeeuw Machine Co., Kensington, Conn. It is claimed by its manufacturer to be outstanding for work requiring machining operations on one, two or three ends. The unit is primarily

used for boring, turning, facing and threading operations. Multiple drill heads and multiple tapping heads can be designed and used on the class of work which requires it.

This machine grips the work piece in the chuck, while machining all ends simultaneously. By this method, the finished piece is true and in line. For



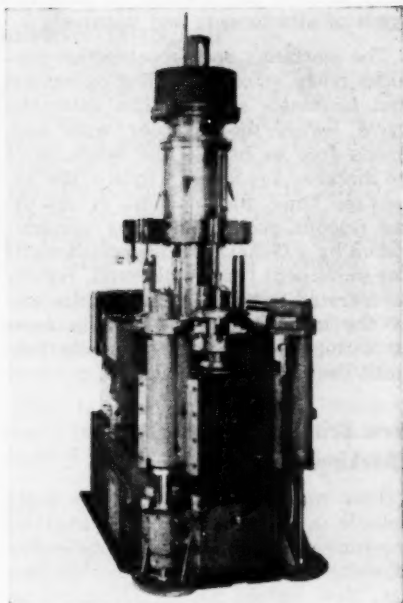
all chucking operations, this tool rotating unit permits a simple and rapid change-over from one job to another, so that retooling for short production runs presents no time-consuming problem.

The "One-Two-Three" Machine employs the rotating tool principle and automatic indexing of a four-position work holding turret for simultaneous machining of three work faces. A patented chucking mechanism gives full jaw travel to chucks.

### **Verti-Hydra-Matic Chucking Machine**

This single spindle chucking machine is made by Production Machinery Development Co., Detroit, Mich. The turret is of the hexagon type so mounted on the column that its six faces are parallel to a vertical revolving spindle. The under face of the turret is also machined to allow the use of additional tools. The reciprocating motion of the turret is actuated by means of a hydraulic cylinder located inside of the stationary column.

The turret moves downward in rapid advance to cutting position, then automatically enters into a pre-determined rate of feed, comes to a positive stop, dwells for shoulder clean-up, then returns to its stop position. It will then automatically index to its next face through a system of intermittent self locking gears.



The vertical side head moves up and down hydraulically, having a cycle of feed for cutting positive stop, dwell, and then rapid return to position. This movement can be controlled in either direction by 90° turn.

The horizontal side head moves through an arc of 45° parallel to the surface of the work table.

Full view adjustable stops are provided for positive stopping of both heads at the end of the feed stroke, for shoulder facing, turning or recessing.

### **Baird No. 76H Chucking Machine**

The Model 76H is a recent product of The Baird Machine Co., 1700 Stratford Ave., Stratford, Conn. This Automatic Chucking Machine is of the work-rotating type; it offers several exclusive features, including a wide range of special operations such as drilling, threading, milling, etc., and is particu-



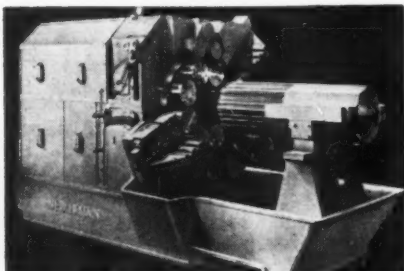
larly adapted for the use of different types of attachments and fixtures.

The machine's open construction provides ready access to tooling operations and facilitates set-ups. The automatic cycle leaves the operator with both hands free to handle the work, since no handles or levers require his attention. Once the machine is set up, the smooth, positive indexing, accomplished by a Geneva motion which starts the movement from a standstill, rapidly accelerates until it approaches the end of the index when it gradually eases to a stop; the work is positively held until the index lock engages.

### **New Britain Model 86 Chucking Machine**

This model machine is an eight spindle automatic work rotating machine made by New Britain-Gridley Machine Div., The New Britain Machine Co., New Britain, Conn. It features an open construction and provides wide easy accessibility to all tools. The tool slide is octagonal and reciprocates on a specially finished tool slide stem. It is actuated forward and reverse with a drum-type cam and a draw-bar working through the center of the tool slide stem.

A hydraulic chuck operating mechanism has chuck operating pressures up to 500 lbs. per square inch. Pressure is developed in an accumulator with a



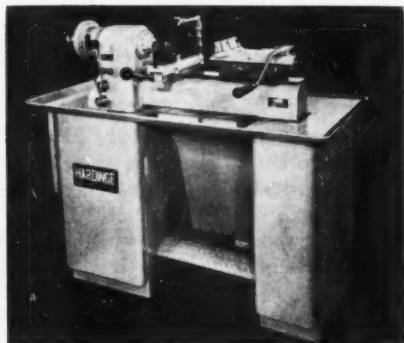
small pump, providing rapid operation as soon as the control valve is opened. Chucks can be opened in any position at the will of the operator.

Safety devices are interlocking to prevent power feed being engaged when the hand feed is used. A frictionally adjustable drive without shearing pin operates through the main cam drum work wheel and prevents damage to the machine parts should a jam occur.

### **Hardinge DSM59 Second Operation**

The new Model DSM59 Second Operation Machine with production threading head is a recent development of Hardinge Brothers, Inc., Elmira, N.Y. This is ideal for close tolerance turning, forming, boring, drilling, threading or facing rapidly. This machine is designed specifically for second operation work. Its preloaded ball bearing spindle is mounted on precision preloaded ball bearings which eliminate camming action, end play and radial play. Permanently lubricated bearings are grease-packed for life.

Centerdrive construction and lubricated bearings afford eight spindle speeds in two ranges of from 230 to 4000 r.p.m., with low and high ratios of 2 to 1 and 3 to 1. The spindle takes standard 1" capacity 5C Hardinge Col-





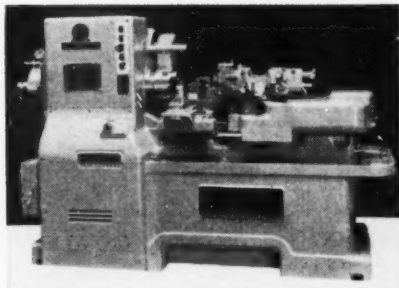
lets which permit the loading of work up to 1" in diameter. The headstock spindle belts may be changed without removing the headstock spindle or any part of the driving unit. A splash guard is furnished as standard equipment for the spindle nose.

### 3U Speed-Flex Automatic Turret Lathe

The model 3U, made by the Potter & Johnston Co., subsidiary of Pratt & Whitney Div. Niles-Bement-Pond Co., Pawtucket, R. I., is a high speed production unit adapted to the machining of small castings and forgings up to 6" in dia. Four automatic changes of spindle speed and three automatic changes of feed are available. These changes are handled by multiple disc clutches and are under electro-pneumatic control.

The turret is automatically clamped in position after indexing. Six faces are provided for tools. Turret slide has a travel of 6".

The 3U has pneumatically operated clutches under dog or hand control. Clutches are engaged and disengaged by air pressure. All changes of speed and feed are readily accomplished while machine is under cutting load. Automatic type spindle stop is provided, allowing cutting tools to return to neutral position without unnecessarily scoring the work.

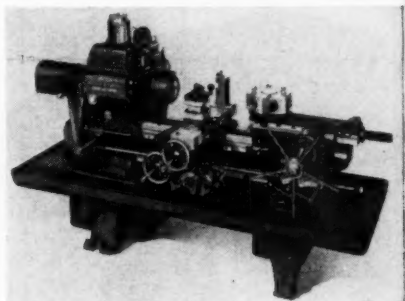


### Warner & Swasey No. 4 Universal Turret Lathe

The headstock in this Ram Type Turret Lathe, made by The Warner & Swasey Co., Cleveland, Ohio, has 12 speeds (24 speeds with two-speed motor), and is equipped with hydraulic brake for stopping the spindle. Machine features the Preselector head by which the operator can pre-select the next speed while the machine is cutting.

Unit has six power feeds, both cross and longitudinal. All feeds are reversible and increase uniformly. Optional change gears halve or double the feeds.

The hexagon turret unit has six power feeds which may be halved or doubled by using optional change gears



in the head end gear box. The automatic indexing turret may be back-indexed or "spun" to skip tool stations.

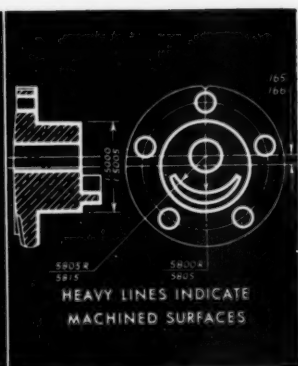
A force-spray lubrication system is used in the headstock. A separate pump circulates oil from an independent cooling reservoir.

A hydraulic power bar feed and collet chuck can be set for any length of bar feed stroke from zero to 8 inches with an adjustable stop screw. The spring-loaded jaws of the bar feed head are scroll tightened, but not fully locked, permitting stripping of the head on the bar for another stroke.

### Part 3 Specifications of American-Built Machines.

The Baird Machine Company			Stratford, Connecticut	
Type-Model No. Spindles	Turning Length	Work Swing	Tool Travel	Spindle Speeds and Horse Power
<b>CHUCKING MACHINE</b> 6 Spindles Model 76H	6"	7 1/4"	5 slides mounted on centerbar, max. move- ment; 6"	33 - 1000 15, 20, 25 or 30 H.P.

The New Britain-Gridley Mach. Div., New Britain Mach. Co. New Britain, Conn.				
Type-Model No. Spindles	Longitudinal Travel of Tool Slide	Work Swing	Tool Travel	Spindle Speeds and Horse Power
<b>MULTIPLE SPINDLE CHUCKING MACHINE</b> 4 Spindles Model 475	6"	7 1/4"	Radial movement lower cross arms: 3 1/2"; radial movement upper cross arms: 5-1/16"; longitudinal movement upper cross arms: 2"	53 - 1028 20 H.P.
4 Spindles Model 49	8"	8 1/4"	Radial movement lower cross arms: 3 1/2"; radial movement upper cross arms: 4 1/4"; longitudinal movement upper cross arms: 2"	38 - 772 20 H.P.
4 Spindles Model 412	8"	11 1/4"	Radial movement lower cross arms: 3 11/16"; radial movement upper cross arms: 4 15/16"; longitudinal movement upper cross arms: 2"	37 - 985 25 H.P.
4 Spindles (tool rotating) Model 23A	Adjustment of turret longitudinally: 5"	Outside chuck jaws: 6"	Stroke of spindle, includ- ing jump: 3" st.; 3 1/2" special	161 - 2400 10 to 15 H.P.
6 Spindles Model 665	6"	6 1/4"	Radial movement lower cross arms: 3 7/8"; radial movement upper cross arms: 5 1/4"; longitudinal movement upper cross arms: 2"	67 - 1294 20 H.P.
6 Spindles Model 675	8"	7 1/4"	Radial movement lower cross arms: 4-1/16"; radial movement upper cross arms: 5"; longitudinal movement upper cross arms: 2"	41 - 970 20 H.P.
6 Spindles Model 695	8"	9 1/2"	Radial movement lower cross arms: 4-5/16"; radial movement upper cross arms: 5 1/4"; longitudinal movement upper cross arms: 2 1/4"	37 - 880 25 H.P.
8 Spindles Model 86	8"	6 1/4"	Radial movement lower cross arms: 6 1/4"; radial movement upper cross arms: 4 1/4"; longitudinal movement upper cross arms: 2"	67 - 1042 20 H.P.
8 Spindles Model 88	8"	8"	Radial movement lower cross arms: 4 1/4"; radial movement upper cross arms: 5"; longitudinal movement upper cross arms: 2 1/4"	43 - 1030 25 H.P.



The National Acme Company			Cleveland, Ohio	
Type-Model No. Spindles	Turning Length	Work Swing	Tool Travel	Spindle Speeds and Horse Power
<b>SINGLE SPINDLE CHUCKING MACHINE</b> Chuck-Matic	4"	12"	Work return for chuck clearance: 6"; cross travel lower slide: 4½"; left hand slide travel: 3"	143 to 524 15 H.P.
<b>MULTIPLE SPINDLE CHUCKING MACHINE</b> 4 Spindles 10"-RPA-4	6"	10"	Tool slide: 6"; cross slide: 2½" or 3½"	30 to 310 15 H.P.
4 Spindles 12"-RPA-4		12"	Tool slide: 7" standard, 8" spec.; cross slide: 3½" standard, 4½" spec.	29 to 505 30 H.P.
6 Spindles 8"-RPA-6	6"	8"	Tool slide: 6"; cross slide: 2½" or 3½"	56 to 456 20 H.P.
6 Spindles 10"-RPA-6		10"	Tool slide: 7" standard, 8" spec.; cross slide: 3½" standard, 4½" spec.	29 to 505 40 H.P.
6 Spindles 12"-RPA-6	8"	12"	Tool slide: 8"; cross slide: 2" or 4"	23 to 202 40 H.P.
8 Spindles 6"-RPA-8	6"	6"	Tool slide: 6"; cross slide: 2½" or 3½"	71 to 580 20 H.P.
8 Spindles 8"-RPA-8		8"	Tool slide: 7" standard, 8" spec.; cross slide: 3½" standard, 4½" spec.	55 to 730 40 H.P.

The Goss and DeLeeuw Mach. Co.			Kensington, Conn.	
Model-Type Size	Chucks on Turret	No. Spindles	Dia. Spindle Noses Speeds, R.P.M.	H.P.
<b>AUTOMATIC CHUCKING MACHINE</b> 7-Spindles Tool Rotating	4	7	2-11/16" Up to 3000 R.P.M.	2 Independent 10 H.P. motors; others for slides, etc.

The Cleveland Automatic Mach. Co.	Cincinnati 17, Ohio
<p>All model A and model AB Cleveland's are equipped with either five or six hole turrets for turret lathe operations. Specifications for these machines were presented in special report number 7 on Automatic Screw Machines, December, 1950 issue.</p> <p>All machines listed under models A and AB are adaptable to chucking operations. The model J Double-End Cleveland is also easily converted to chucking operations. Discussion of this convertability feature will be found under part 2 of this report.</p>	

Cone Automatic Machine Co., Inc.		Windsor, Vermont	
Model-Type Size	Capacity R=Round; S=Square; H=Hexagon	Tool slide travel	Spindle Speeds and Horse Power
<b>CHUCKING MACHINE</b> 5-Spindles	R=8¼"; S=6½"; H=7½"	6"	1200 RPM; 25 H.P.

Greenlee Bros. & Co.	Rockford, Illinois
Greenlee bar machines can be converted to chucking machines. Machines are designed to make a changeover quickly: hand-operated, semi-automatic, or fully automatic loading devices.	
Specifications for the Greenlee 4-spindle 1½", 2½" and 6-spindle 1", 1½", and 2" will be found in report number 7 on Automatic Screw Machines, December 1950 issue. Discussion of the convertability feature will be found under part 2 of this report.	

**Potter & Johnston Co., Subsidiary Pratt & Whitney Div. Niles-Bement-Pond Co.  
Pawtucket, R. I.**

Model-Type	Swing B=Swing over bed; C=Swing over cross slide	Spindle; Speeds; Horse Power; Chuck Size	Turret and Travel	Cross Slide. Feeds for Cross Slide and Turret.
<b>TURRET LATHE</b> Automatic, Model 3U Speed-Flex	B=9½"	Hole through spindle: 1½"; 73 to 1445 R.P.M.; 5 H.P.	6 Faces. Turret slide travel 6"; turret feed: 4½"	Travel of cross slide-front 2½", rear 2½", each way. Feed: .0023" to .0684" or .0042" to .125"
Automatic, Model 4D	B=21"; C=9¾"	Hole through spindle: 1½"; 20 to 370 R.P.M.; 7½ H.P.	5 Faces (4 & 6 spec.) Turret slide travel: 9½"; turret feed: 5½"	Travel of cross slide, each way: 3¼". Feed: .0034" to .0504" or .0034" to .1008"
Automatic, Model 4DE (Elevated)	B=25½"; C=14¾"	do	do	do
Automatic, Model 5D Power Flex	B=25"; C=12"	Hole through spindle: 2½"; chuck size (when ordered) 15", 16", 18", 21"; 10 to 15 H.P.; 16 to 340 R.P.M.	5 Faces (4 & 6 spec.) Turret slide travel: 13"; turret feed: 8"	Travel each way: 5" Feed: .007" to .165" or .007" to .083"
Automatic, Model 5DE Power Flex (Elevated)	B=30"; C=17"	do	do	do
Automatic, Model 5DLX Power Flex (long. travel and extended)	B=25"; C=12"	do	5 Faces (4 & 6 spec.) Turret slide travel: 16"; turret feed 8"	do
Automatic, Model 5DELX Power Flex (elevated, long. travel and extended)	B=30"; C=17"	do	do	do
Automatic, Model 5D 2-Spindle Power Flex 5 Face Turret 9"	B=21½"; Distance between spdls.: 10½"	Hole through spindle: 1½"; chuck size: 9½"; 10 H.P. 27 to 615 R.P.M.	5 Faces. Turret slide travel: 11½"; turret feed: 11"	Travel each way: 5"
do 6 Face Turret 9"	do	do	6 Faces. Turret slide travel: 8¾"; turret feed: 8¼"	do
Automatic, Model 5D 2-Spindle Power Flex 12"	B=23"; Distance betwn. spdls.: 15½"	Hole through spindle: 1½"; chuck size: 12" 15 H.P. 19 to 613 R.P.M.	5 or 6 Faces. Turret slide travel: 16"; turret feed: 8"	do
Automatic, Model 5D 2-Spindle Power Flex 15"	B=28"; Distance betwn. spdls.: 15½"	Hole through spindle: 1½"; chuck size: 15" 15 H.P. 16 to 525 R.P.M.	do	do
Automatic, Model 6-DRE	B=34"; C=21"	Hole through spindle: 2½"; chuck size (when ordered) 18", 21", 24", 30"; 10-15 H.P.; 9 to 167 R.P.M.	5 Faces. Turret slide travel: 18"; feed: 18"	Travel each way: 8½". Feed: .007" to .250" or .007" to .089"
Automatic, Model 6-DREL	do	do	5 Faces. Turret slide travel: 28"; feed 13"	do
Automatic, Model 6-DRELX	do	do	5 Faces. Turret slide travel: 28"; feed 22¼"	Travel each way: 6¼"
Automatic, Model 6DS	do	Hole through spindle: 5¼"; chuck size (when ordered) 21", 24", 30" 25 H.P. 8.5 to 187 R.P.M.	6 Faces. Turret slide travel: 28"; feed: 13"	Travel each way: 8½". Feed: .003" to .250" or .007" to .089"
Automatic, Model 6DSE	B=40"; C=27"	do	do	do
Automatic, Model 8-DT Serial 80607	B=36"; C=23"	7-160 R.P.M.	6 Faces. Turret slide travel: 32"; feed: 15"	Travel each way: 6¼". Feed: .003" to .119" or .003" to .0355"
Automatic, Model 8-DXT Serial 80607	do	do	do	do
Automatic, Model 8-DT Serial 80608	do	do	6 Faces. Turret slide travel: 32"; feed 16"	do
Automatic, Model 8-DXT Serial 80608	do	do	do	do

This model also available in extended capacity, Model 9-DT. This model has  
a swing over bed-ways of 40" and is equipped with special type of heavy duty  
cross slide.

# The Warner & Swasey Company

Cleveland, Ohio

Type-Model	Chuck Capacity R=Round; S=Square; H=Hexagon	Swing B=Over Bed; C=Over Cross Slide	Turret Faces. Travel	Spindle Speeds Feeds Horse Power
<b>TURRET LATHE</b> No. 1 Electric	R=3/8"; S=7/16"; H=1/2"; Bar Feed: max. dia. and stroke: 3/4"x4"	B=11"; C=4 1/4"	6 Faces. Cross travel: 4 1/2"	600 to 1800 or 600 to 3600
No. 2 Electric	R=1"; S=1 1/16"; H=3/8"; Bar Feed: max. dia. and stroke: 1"x6"	B=14"; C=6"	6 Faces. Cross travel: 5"	600 to 1800 or 600 to 3600 Power feed: .003" to .030"
Electro-Cycle Ram Type 16"	R=1 1/2"; S=1 1/8"; H=1 1/8"	B=16 3/8"; C=9"	6 Faces. Cross travel: 5 1/2" or 8" (spec) 8" (screw feed). Long. travel: 15 1/8"	300 to 2000 Power feed: .003" to .030" 5 - 2 1/2" H.P.
Electro-Cycle Ram Type No. 2	R=1"; S=3/4"; H=3/8"	B=14"; C=6"	6 Faces. Cross travel: 5"; long. travel: 12"	250 to 1050 low range. 356 to 1550 high range. Cross feed: .0025" to .026". Long. feed: .003" to .030" 7 1/2/3 3/4 H.P. Power feed turret: .003" to .030"
Electro-Cycle Ram Type No. 3	R=1 1/2"; S=1 1/8"; H=1 1/8"	B=15 3/8"; C=7"	6 Faces. Cross travel: 8"; long. travel: 17 1/4"	do
Geared Head Ram Type No. 2	R=1"; S=3/4"; H=3/8"	B=14"; C=6"	6 Faces. Cross travel: 5"; long. travel: 12"	134 to 1480 high speed 7 1/2 H.P.; 67 to 740 low speed 5 H.P.; 67 to 1480 (two speed motor) 7 1/2-3 3/4 H.P. Power feed turret: .003" to .030"
Geared Head Ram Type No. 3 Universal	R=1 1/2"; S=1 1/8"; H=1 1/8"	B=15 3/8"; C=7"	6 Faces. Cross travel: 8"; long. travel: 17 1/4"	do
Geared Head Ram Type No. 4 Universal	R=2"; S=1 1/8"; H=1 1/4"	B=18 1/2"; C=9 1/2"	6 Faces. Cross travel 9"; long. travel 22"	60 to 1532 h.s. 7 1/2 or 10 H.P. 30 to 766 l.s. 7 1/2 H.P. 30 to 1552 two speed motor 7 1/2, 3 3/4 or 10/5 H.P. Power feed turret: .003" to .030"
Geared Head Ram Type No. 5 Universal	R=2 1/2"; S=1 1/4"; H=2 3/8"	B=20"; C=10 1/4"	6 Faces. Cross travel 10"; long. travel 24"	52 to 1316 h.s. 7 1/2 or 15 H.P. 26 to 658 l.s. 7 1/2 H.P. 26 to 1316 two speed motor 7 1/2, 3 3/4 to 15/7 1/2 H.P. Power feed turret: .005" to .049"
Heavy Duty Saddle Type 1-A Universal	R=2 1/4" or 3"; S=1 1/4" or 2 1/8"; H=2 3/8" or 2 1/8". Length turned: 35" or 30"	Max. swing: 18"	6 Faces. Cross travel: 11"; long. travel: 36"	40-916 h.s. 10 to 20 H.P. 20-458 l.s. 7 1/2 or 10 H.P. 20-916 h.s. two motors 10/5 to 20/10 H.P. Cross feed: .0022"-.073" Long. feed: .004"-.149"
Heavy Duty Saddle Type 2-A Universal	R=3 1/2"; S=2 7/8"; H=3"; Length turned: 36 1/2"	Max. swing: 21 1/2"	6 Faces. Cross travel: 13"; long. travel: 44"	34-920 h.s. 15 to 30 H.P. 17-460 l.s. 10 or 15 H.P. 17-920 h.s. two speed motor. 15/7 1/2 H.P. to 30/15 H.P. Cross feed: .0022"-.073" Long. feed: .004"-.149"
Heavy Duty Saddle Type Model 3-A	R=4 1/2" or 6"; S=3 1/8" or 4 1/4"; H=3 3/8" or 5 1/4"; Length turned: 44 1/4" or 42 1/4"	Max. swing: 24 1/2"	6 Faces. Cross travel: 14 1/4"; long. travel: 52"	24-628 h.s. 25 to 40 H.P. 12-314 l.s. 15 to 20 H.P. 12-628 h.s. two speed motor. 25/12 1/2 H.P. or 40/20 H.P. Cross feed: .0025"-.082" Long. feed: .005"-.167"



# The Warner & Swasey Company

Cleveland, Ohio

Type Model	Chuck Capacity R=Round; S=Square H=Hexagon	Swing B=Over Bed; C=Over Cross Slide	Turret Faces, Travel	Spindle Speeds Feeds Horse Power
Heavy Duty Saddle Type Model 4-A-1500	R=8" or 9"; S=5 1/4" or 6 1/8"; H= 6 1/8" or 7 1/4" Length turned: 51"	Max. swing: 29 1/2"	6 Faces. Cross travel: 17"; long travel: 54 1/8"	16-424 h.s. 30 to 50 H.P. 8-212 l.s. 20 or 25 H.P. 8-424 h.s. two speed motor, 30/15 to 50/25 H.P. Cross feed: .0031" .1025" Long. feed: .005" .167"
Heavy Duty Saddle Type Model 4-A-1550	R=12"; S=8 1/4"; H=10 1/4" Length turned: 48"	Max. swing: 29 1/2"	do	12-315 h.s. 20 to 30 H.P. 8-210 l.s. 20 or 25 H.P. 6-315 h.s. two speed motor, 20/10 to 30/15 H.P.; Cross feed: .0031" .1025" Long. feed: .005"-.167"

# The Warner & Swasey Company

Cleveland, Ohio

Type-Model No. Spindles	Turning Length	Work Swing	Tool Travel	Spindle Speeds and Horse Power
SINGLE SPINDLE CHUCKING MACHINE	6"	8 1/2"	Turret: 5 faces; stroke: 7 1/4"; center of spindle to turret face: 5 1/8"; cross slides: 3" travel	High: 337 to 1498 Low: 57 to 612 10 H.P.
MULTIPLE SPINDLE CHUCKING MACHINE 5 Spindles		6"	Turret stroke: 0-5"; lower cross slide: 0-3"; upper cross slide: 0-1 1/2"; reaming stroke: 3/16"- 3 1/4"	107 - 1168 15 H.P.

# Production Machinery Development Co.

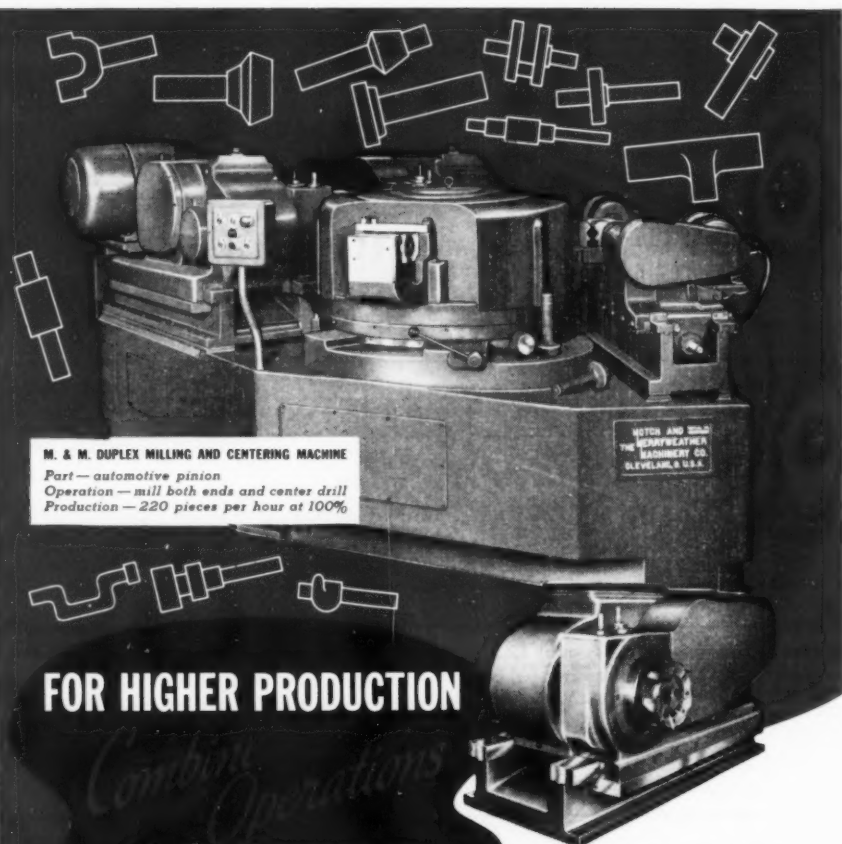
Detroit, Michigan

Type-Model No. Spindles	Capacity	Tools	Turret and Travel	Spindle Speeds and Horse Power
VERTICAL CHUCKING MACHINE Type 1-A	16" max. dia. of work; 7" full boring bar depth	6 tool holder supports and 2 bars 2" dia.	6 faces, 12 1/4"x4 1/2"; 15" total vertical travel. Ver- tical side head, 9" move- ment, horizontal side head, 45° horizontal movement, 9" vertical adjustment	10 - 1740 5 H.P.

# Hardinge Bros., Inc.

Elmira, New York

Type-Size Model	Capacity	Swing	Turret Stations, Travel	Spindle Speeds and Feeds. Horse Power
CHUCKING CHUCKING MACHINE Model HC	Step chuck cap: 6"; Jaw chuck cap: 5"; Collet cap: 1"	13"	8 stations; 13" turret travel	8 speeds to 3,000; power feeds: .001"; .002"; .003"
Model HCT	do	Max. work fixture diameter: 10 1/4"	8 stations; 13" turret travel	8 speeds to 3,000; power feeds: .001"; .002"; .003"
Same as Model HC except that it is equipped with a Production Threading Head. Length for threading is 1 1/4"; dia. for threading-internal and external: 6"				
HAND SCREW MACHINE Model DSM59	Round: 1" hexagon: 3/8"; square 3/8". Step chucks: 1 1/8" to 6"; jaw chucks: 5"	9"	6 stations; 4" travel of turret slide; 3 1/4" travel of double tool cross slide	8 speeds from 230 to 3500
Model AC59	do	do	do	do
Same as Model DSM59 except that it features an air-operated collet and foot pedal control for opening and closing collet.				



**M. & M. DUPLEX MILLING AND CENTERING MACHINE**

*Part — automotive pinion*

*Operation — mill both ends and center drill*

*Production — 220 pieces per hour at 100%*

**FOR HIGHER PRODUCTION**

*Combining Operations*  
**ON MOTCH & MERRYWEATHER  
 SPECIAL MACHINES**

You can be sure of getting higher production with lower cost per piece by using Motch & Merryweather machines designed for multiple operations. The machine pictured here mills and center

drills a vast range of parts, some of which are shown in white above. Our representative will help you obtain thorough-going accuracy, together with *production, PRODUCTION, and MORE PRODUCTION.* Contact us now.

*The Motch & Merryweather milling head features rigidity at the tool point.*

Manufactured by \_\_\_\_\_

**THE MOTCH & MERRYWEATHER MACHINERY COMPANY**

715 PENTON BUILDING

CLEVELAND 13, OHIO

*Builders of Circular Sawing Equipment, Production Milling, Automatic and Special Machines*

**PRODUCTION - WITH - ACCURACY MACHINES AND EQUIPMENT**





# Letter from Great Britain

**New Lathe.** What is believed to be a lathe of quite new design has just been introduced by Alfred Herbert Ltd. for turning and boring workpieces of relatively large diameter but short length, such as brake drums, pulleys and motor endplates. In view of its construction it has been termed a "stub lathe". The machine consists of a headstock of conventional design mounted on a base; the front of the base along the length of the headstock constitutes the slide-way for a compound tool rest. Thus the machine does not have the conventionally long bed of a lathe and is extremely compact. The nose of the headstock spindle supports the workpiece by means of chucks or special fixtures and is quite accessible for loading and unloading heavy work. In general the machine is used for machining surfaces concentric to an existing bore. Cutting is thus done from the back of the component instead of from the front, as on a lathe of conventional design. The machine has an automatic machining cycle which is initiated by the movement of a single lever when the component has been secured to the spindle by air operated chucking arrangements. At the end of a cut the tool is automatically retracted from the newly machined surface so that the surface is not marked when the tool is returned to the starting position.

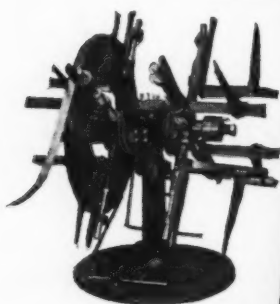
**Gas Turbine Engines.** Several firms in this country and abroad are de-

veloping gas turbine engines for use in road transport vehicles and Mr. W.E.P. Johnson of Power Jets (Research and Development) Ltd., a Government sponsored concern, said that it will not be long before we see in this country national or international races between motor cars powered by gas turbines. He maintains that the only way to get the gas turbine adopted by industry as a prime mover is through its use in racing cars. He claims that such races would show the advantages of the gas turbine as a means of propulsion and would demonstrate that it is much superior to the existing piston engine for motor transport purposes.

**October** was the month of highest output in the steel industry when it was at the rate of 17,040,000 tons per annum. In spite of this the engineering industry, and especially the motor car builders, are complaining about the shortage of steel.

**Record Exports.** October was also a record month for exports from Britain which reached the value of £202,200,000. In addition, the adverse visible trade balance was reduced in spite of the fact that imports were somewhat higher. Our exports to North America reached the figure of £25,100,000. To encourage the export of our goldsmiths' work to North America, it has been decided that those goldsmiths who do export in this way will receive a bonus in the form

**LESS DOWN TIME, MORE PRODUCTION  
FROM PUNCH PRESSES FED BY**



# LITTELL DOUBLE AUTOMATIC CENTERING REELS

Vital minutes are saved, with practically no down time for coil replacement, when a Littell Double Reel uncoils stock to the punch press. The idle side of the reel is loaded while the other side pays out. When a coil is used up, the operator simply lifts the hub lock pin, then swivels the reel 180°, thus placing the reserve coil in press feeding position. The change-over is complete in a few seconds. Like Littell Single Reels, Littell Double Reels combine balance that means smooth running accuracy with rugged malleable iron and steel construction that assures year in, year out dependability.

## FOUR SIZES

- No. 3 . . . . . for coils up to 300 lbs.
- No. 5\* . . . . . for coils up to 600 lbs.
- No. 10\* . . . . . for coils up to 1,000 lbs.
- No. 25\* . . . . . for coils up to 2,500 lbs.

\*Can be furnished with motor drive.

F. J.

Write for catalog

**LITTELL  
MACHINE CO.**

ROLL FEEDS • DIAL FEEDS • STRAIGHTENING  
MACHINES • REELS • AIR BLAST VALVES

4147 N. RAVENSWOOD AVE. • CHICAGO 13, ILL.

of an allowance of 50 per cent of the gold they export which can be made into goods for the home market.

.....

B.S.A. Tools Ltd., co-operating with Lodge Plugs Ltd., makers of sparking plugs, are now producing ceramic tipped cutting tools which should solve many awkward problems. Ceramic tools are not new in themselves but this new tool material does possess advantages. Known as B.S.A.-Sintox, the material is suitable for machining abrasive ma-

terials such as wood-filled plastics, fibre, graphite and asbestos. Under normal running conditions wear upon the tool tip is very slow and no trouble is occasioned by the building up of the workpiece material on the cutting edge. Tool tips for lathe tools and inserted tooth milling cutters are available in most of the standard shapes in which carbide tips are manufactured and the material is said to be very suitable for the finish machining of brass and magnesium alloys. Cutting

# ACCURACY TO .0001"

## FOR TOOL ROOM AND PRODUCTION

FOR AS LITTLE AS  
**\$117.50**

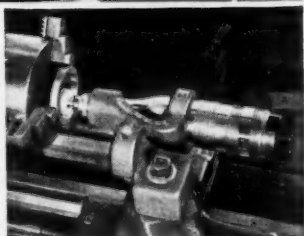
IN PRECISE MOUNTS ON LATHES AND OTHER MACHINE TOOLS. PRECISE GRINDER-MILLERS WITH 1/4 H.P. AND SPEEDS FROM 20,000 TO 45,000 R.P.M. DO THE WORK OF SINGLE-PURPOSE MACHINES COSTING 100 TIMES AS MUCH!



**VERSATILITY.** For cylindrical, internal, external and form grinding; for milling with H. S. steel or tungsten carbide midget mills; for micro-finishing and polishing. Use on wood, glass, rubber, plastics, or any metal including the hardest alloy steel.

**DURABILITY.** All metal housing, rigid PRECISE quill, lubricant-sealed, micro-precision bearings 1/4 H. P. AC-DC motor (115 volts) is protected by replaceable fusetrans.

**ATTACHABLE COOLFLEX SHAFT** (optional). Quickly attached for bench work and handtool applications. Same speeds, same precision quill as in PRECISE GRINDER-MILLERS.



PRECISE PRODUCTS CO.,

*Write* FOR CATALOG  
1331 Clark St., Racine, Wis.

## PRECISE GRINDER-MILLERS

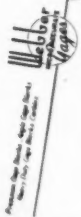
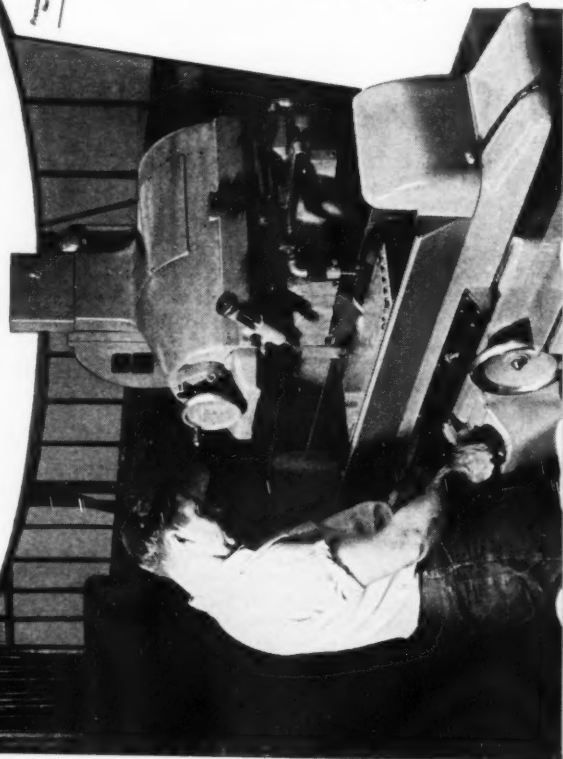
speeds can be very high and under suitable conditions the material will give highly satisfactory results with cutting speeds at least twice as high as those used for tungsten carbide tools. Grinding the tools should be done with diamond wheels using a cutting oil and the rate of material removal during grinding is much higher than when grinding with tungsten carbides.

The Austin Motor Co. are hopeful of setting up a motor car assembly plant

in Mexico. Investigations and talks have been going on for some three years and it is now confirmed that negotiations are under way for the establishment of the plant.

Coal production fluctuates in this country for various reasons and now we are being forced to import this commodity. In view of the fact that there is so much coal under Britain and that it is just a matter of digging it out many people here do not view

*Here's Proof*  
The New Thompson Type 2F is a  
**SUPER PRECISION**  
Tool Room Grinder



WEBBER GAGE COMPANY  
12900 TRIMBLE ROAD - CLEVELAND 11, OHIO

November 10, 1960

Mr. Wilson, Vice President  
Thompson Grinder Company  
Springfield, Ohio

Dear Mr. Wilson:

We recently installed a new THOMPSON Tool Room Grinder to grind Gage Blocks to our specifications and tolerances. The results have been very satisfactory and in spite of the close limits to which the work has to be done. We thought you would be interested in the performance of this machine.

Very truly yours,

WEBBER GAGE COMPANY

*Gene D. C. 11*



Thompson 2F Grinder photo-  
graphed in the Webber Gage Co.,  
Cleveland Plant

## COMPARE THIS NEW 8 x 10 x 24 TOOL ROOM GRINDER

### Compare These Features:

- HARDENED AND GROUND cross slide ways completely sealed.
- One shot lubrication to cross slide ways and saddle bearings.
- HARDENED AND GROUND sealed anti-friction vertical slide.
- HARDENED AND GROUND BED WAYS with automatic lubrication.
- 3600/1800 R.P.M. 2 speed wheel head. Heavy alloy steel spindle heat treated, runs in super precision ball bearings accurately preloaded, lifetime lubricated.
- Handy control panel.
- Elevation micrometer stop graduated in .0001".
- GROUND THREAD FEED SCREW.
- Automatic wheel TRUING device.
- Longitudinal hand wheel with automatic engagement.
- Hydraulic head movement throttle with rapid traverse.
- Hydraulic table movement throttle.
- Elevating hand wheel graduated in .0005".
- GROUND THREAD FEED SCREW.

WRITE TODAY for complete specifications and performance data. Address Dept. 13 Thompson Grinder Co., Springfield, Ohio.

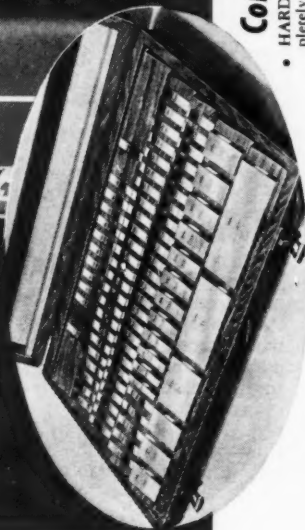
COPYRIGHT 1951 BY THE THOMPSON GRINDER CO.

➤ The only manufacturer of a complete range of heavy duty and light duty surface and contour grinders for industry.

# Thompson SURFACE Grinders

The Thompson Grinder Company, Springfield, Ohio

*When working to a tolerance of four millionths of an inch such as is observed when making Webber Gage Blocks, the rough or preliminary grinding plays an important role in keeping cost of the final finishing within reasonable limits.*





Countless users of open back inclinable presses can now have the advantages of Verson press design in economical units suitable for a wide variety of stamping jobs. Such features as the allsteel frame . . . machine cut steel gear and pinion . . . split cap main and crankpin bearings . . . mechanically interlocked type pneumatic friction clutch and brake unit . . . and many others are all incorporated into the Verson O.B.I. line. Six models, rated in maximum capacity at 90, 105, 125, 150, 210 and 250 tons respectively, are now available.

Bulletin OBI-49 gives design details and specifications. Write for a copy, today.

## **VERSON ALLSTEEL PRESS CO.**

9303 South Kenwood Avenue Holmes St. and Ledbetter Drive  
CHICAGO 19, ILLINOIS DALLAS 8, TEXAS

**THERE'S A Verson PRESS FOR EVERY JOB  
FROM 15 TONS UP!**

this with much favour. One of these is Lord Hyndley who is Chairman of the National Coal Board which under nationalisation controls the British mines. He is in favour of importing foreign miners instead of foreign coal. In order to improve our position a six-day week is to be adopted by some pits instead of the present five day week.

**The Supply of Non-Ferrous Metals** is dwindling in this country and many branches of the engineering industry

are viewing this with alarm. Zinc, tin, copper and lead are all getting in short supply and as blame must be allocated for this somewhere, American stock piling is being put forward as one of the causes of the shortage. During the war years our aluminum industry expanded and one of the companies has just opened a new plant, but today aluminum also is getting in short supply. Much of the zinc used in this country is consumed by the galvanizers and it is likely that wartime specifica-

# News about steel

FROM U·S STEEL SUPPLY



WHEN YOU DEAL  
WITH US, YOU GET  
**Service  
Plus!**

## What effect will "Mobilization Economy" have on steel supplies?

● Our economy is now entering an extended period unlike any other in our history. During this period, industrial efforts will be divided between building an adequate defense machine and maintaining our high standard of living. Industries working on government defense orders will have "DO" priority ratings and get first call on critical steels. Steel distributors will replenish their inventories by passing these defense orders along to steel producers.

Under these circumstances, if you do not have a "DO" priority rating you may have difficulty obtaining certain steel items essential to defense. Substitute steels can frequently be employed, but you may need help in locating suitable material.

**Here's how to get the help you need:** Call in a United States Steel Supply Company representative. He will do his best to locate the type of steel your work requires. That's his job . . . to give you the best *service* possible, whatever the circumstances.

## UNITED STATES STEEL SUPPLY COMPANY



Warehouses and Sales Offices:

BALTIMORE • BOSTON • CHICAGO • CLEVELAND • LOS ANGELES  
MILWAUKEE • MOLINE, ILL. • NEWARK • PITTSBURGH • PORTLAND, ORE.  
SAN FRANCISCO • SEATTLE • ST. LOUIS • TWIN CITY (ST. PAUL)

Sales Offices: INDIANAPOLIS • KANSAS CITY, MO. • PHILADELPHIA  
ROCKFORD, ILL. • TOLEDO • TULSA • YOUNGSTOWN

Headquarters Offices: 208 S. La Salle St.—Chicago 4, Ill.

UNITED STATES STEEL



### **Delta 17" Drill Press**

Complete selection to meet every need—with the right capacity, the right speed—in floor and bench types... single spindles, multi-spindle batteries, individual heads for special set-ups... power-feed or foot-feed — and a complete line of accessories for every model. The same selection in 12" drill presses. All told, 144 different models at prices from \$77.50 to \$2,000.00.

High-production set-up to drill 19 holes in 3 sides of pump housing at the Hell Co., Milwaukee. 8 17" Drill Press heads (5 standard 2-spindle heads, and 3 with special 3- and 5-spindle heads) mounted on a special table with suitable controls make up this low-cost machine.

# **DELTA MILWAUKEE**

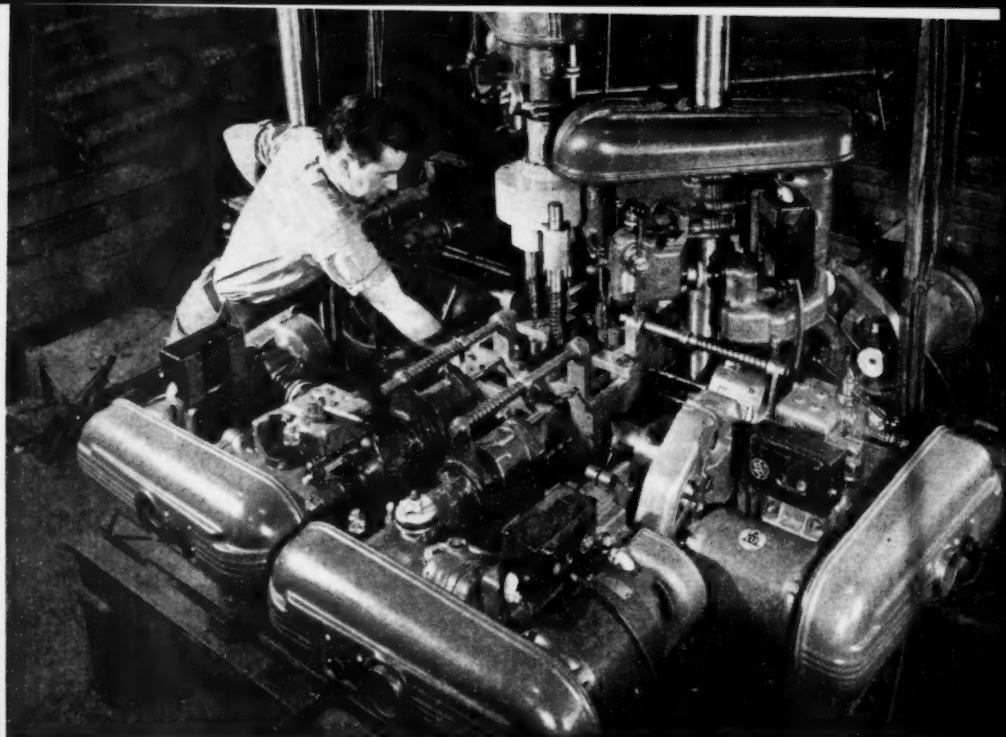
## ***Delta Drilling***

**Build your own special equipment at low cost around Delta accuracy and flexibility!**

When you think of drilling think of Delta! Your own imagination plus the amazing adaptability of standard Delta drill presses or components can crack the toughest problem. Look what the Hell Co. did (at right, above) with 8 Delta heads! One operator drills 19 holes in a casting — in a floor-to-floor time of 2.6 minutes! And at a fraction of the cost of a special-purpose machine, or a multi-station operation!

**From the world's  
most complete line**

**First in Selection!  
First in Quality!  
First in Value!**



# *from every Direction!*

Do the same in your shop! The sealed, lubricated-for-life ball bearings in Delta drill heads let you drill from all directions—vertical, sideways, upside-down, at all angles—without lubrication problems.

Send for complete details—and plan your jobs around the versatility of dependable Delta Tools—high in quality, low in cost! Delta's engineering service is always ready to help you. Speed production, save time, and reduce investment with versatile Delta machines.

Sold only through authorized dealers—available on easy time payments. . . Look for the name of your Delta dealer under "Tools" in the classified section of your telephone directory.

DELTA POWER TOOL DIVISION



**Rockwell**

Manufacturing Company

MILWAUKEE 1, WISCONSIN

DELTA • MULTIPLEX • CRESCENT • HOMERCAST

**Tear out this coupon and mail today!**



**Free...**

**6 TIMES A YEAR**

The Power Tool Journal—packed with detailed job data, fully illustrated—handbook of time- and money-saving shop ideas!

Delta Power Tool Division  
ROCKWELL MANUFACTURING CO.  
605A E. Vienna Ave., Milwaukee 1, Wisconsin

Send me free — ☐ The Power Tool Journal — 6 times a year.  
☐ Catalogs and bulletins on complete Delta line.

Name.....

Title.....

Company.....

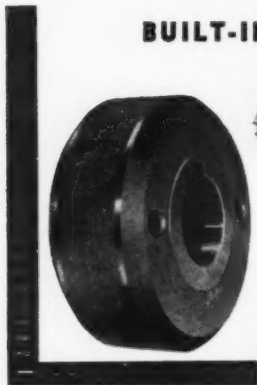
Address.....

City..... (.....) State.....

W-51A



## BUILT-IN MARKING DIE



*Flexibility*

**WITH PARKER'S  
INTERCHANGEABLE  
SEGMENT ROLL  
MARKING DIE**

- One roll marking die to tackle the exacting job of marking thousands of carpenter's squares. Clear accurate lettering was just as sharp for the 1000th impression as for the first. Individual segments can be removed, changed or replaced in seconds. One Parker Roll Die does the job of dozens of solid roll dies.
- The *flexibility* of Parker's Patented Taper Lock roll marking dies is solving difficult marking problems — saving down-time — saving money — every hour, every day for cost-conscious progressive manufacturers. This is but one of the exclusive Parker marking dies.
- For a better mark on *your* product, faster, cleaner, and at less production cost — investigate the *flexibility* of Parker's facilities. From stock marking numbers to specially engineered marking devices. Mechanical engraving and embossing. Parker marking dies for steel, brass, aluminum, plastic or wood.

### SEND FOR THE PARKER BLUE BOOK

Steel Stamps, Marking Dies, Coining Dies, Embossing Dies, Mechanical Engraving and Special Marking Projects. Be sure to have the *Parker Blue Book* in your file.



tions quoting thinner coatings of zinc will be resorted to for galvanized sheet or wire. The new plant mentioned above was installed by the Northern Aluminum Co. as an extension to their works. Rogerstone and the output capacity of the new plant is at present 50,000 tons per annum, which is half peak production figure attained by all British plants together during the war.

Employees of the Ford Motor Co. have just received an increase of 3d. an hour

on their standard rates. This new wage scale was negotiated between the management and a joint committee representing seventeen trade unions whose members were involved.

**New Plant for Vauxhall.** Another car manufacturing company in this country of American parentage is the Vauxhall Co. at Luton, a branch of General Motors, who now have what is thought to be the largest and most modernly equipped works under one roof. This



factory represents the first stage in a five-year plan which involves the cost of £11,000,000. The building is one third of a mile long and 160 yards wide and covers 19½ acres.



"I hope it doesn't take too long to talk you into an order, I have a terribly contagious cold."

WHEN ACCURACY COUNTS...

Contact **SCHERR!**



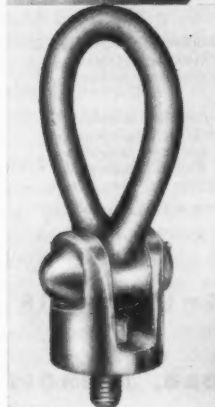
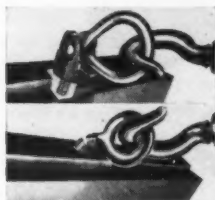
*The Wilder*  
**MICRO**  
**PROJECTOR**  
with the  
**VERTICAL**  
**DESIGN...**

- OPTICAL PROJECTION DETECTS ERRORS
- HORIZONTAL STAGE: NO CLAMPS NEEDED
- COMFORTABLE INCLINED SCREEN
- MICROMETER CROSS SLIDE ADJUSTMENTS

SEND FOR ILLUSTRATED BULLETIN  
OR ASK FOR OUR REPRESENTATIVE  
TO DEMONSTRATE THE "VERTICAL  
DESIGN" PROJECTOR...

**GEORGE SCHERR CO., Inc.**

198 Lafayette St., New York 12, N.Y.



**SPEED SAFETY, ECONOMY**  
**IN YOUR SHOP LIFTING—USE . . .**

*Schaffer* { **LOAD CENTERING**  
**EYE BOLTS**

**NOT A MERE EYE BOLT — BUT A NECESSARY TOOL**

Has a perfect self load centering action which provides true alignment of load. Eliminates bolt thread straining and breaking off.

- provides greater safety for your men and saves valuable time.
- Prevents costly damage to Machinery, Dies, Tools, Etc., caused by standard eye bolts shearing off.
- Built to last a lifetime.
- Made of high grade steel . . . whose ductility and toughness is greater than ordinary Commercial Steel . . . therefore, Schaffer Eye Bolts can be subjected to heavy intermittent jerks and strains.
- Thousands in use in all industries.

**STOCK ITEMS**

½" to ⅝"—\$11.75 each,

¾"—\$13.50 each,

⅞" to 1"—\$23.50 each

Specials on quotation.

When ordering specify amount and bolt thread size.

**S. S. SCHAFFER CO.**  
**1846 E. 57th ST. LOS ANGELES 58, CAL.**

# GET...

GREATER NUMBER OF JOBS,  
FEWER NON-PRODUCTIVE HOURS ON  
A MEDIUM SIZE LATHE



● Usually only in larger, more expensive models do you find the combination of speeds, swing, centers, power, feeds and threads that are standard equipment on Rockford Economy Lathes. These features make it possible to machine a wider range of work with fewer non-productive hours than is possible with many machines in its class.

That's why we say it's the best lathe value on the market today. It is medium-sized and economy-priced, but it's built to handle any job that can be turned or threaded within 16½" or 18½" swing, 30" full or 35" maximum overhanging centers. 3100 lbs. of weight, 6' bed and zero precision bearings give it the rigidity and precision for turning out tool room accuracy. Doesn't that sound *right for more production in your shop?*

A Rockford representative will give you full details on these machines and we will gladly send our new bulletin No. 900D on request.

MEDIUM-SIZED

ECONOMY-PRICED

ROCKFORD ECONOMY LATHES—16" and 18"

513  
ROCKFORD MACHINE TOOL CO. • ROCKFORD, ILLINOIS

# EFFECTIVE



## DUST CONTROL IN SAW MANUFACTURING

BY S. H. FAIN,  
DUST CONTROL  
DIV., AMERICAN  
AIR FILTER CO.,  
INCORPORATED.  
LOUISVILLE, KY.

At the E. C. Atkins and Company's plant at Indianapolis, the wide range of hood designs illustrate many excellent ways of controlling dust from metal working operations. All exhaust systems are kept localized to small areas of operation to provide flexibility in case of future rearrangement of production, and to permit selection of dust collection equipment most suited to the specific requirements of the material released in each area.

To keep pace with the growing demand for their quality products, E. C. Atkins and Company, manufacturers of all types of Saws, Saw Tools and Machine Knives since 1857, found it necessary to streamline their manufacturing operations and move into larger quarters. This resulted in the construction of a new, modern one floor building 780' x 200', and was also the occasion for modernization of the manufacturing facilities. Lighting, ventilation, heat-treating, motorizing of machine tools, dust control and exhaust ventilation were completely reviewed. This prompted a decision to abandon the old-style, large central-system-

In saw manufacturing the dust problems in a single plant are varied and complex. Because the quantities, characteristics and natures of the dusts released usually differ so widely, it is necessary to evaluate each operation for effective methods of exhaust ventilation and dust control.

---

type of exhaust duct and cyclone collector arrangements.

All metal working, polishing and dry grinding operations in the new building are exhausted by small Type D Roto-Clones with viscous aftercleaners, permitting recirculation of the cleaned air with consequent heating savings. Most of these units have capacities under 4000 cfm giving complete flexibility to the arrangements and permitting rapid movement of machinery with their exhaust ventilation and dust collection equipment with a minimum of cost and rearrangement.

To carry out this program, E. C. Atkins and Company installed 37 Roto-Clones handling an exhaust capacity of 75,000 cfm. The advantage of the unit system became evident when the transfer of operations to the new building was done section by section as con-

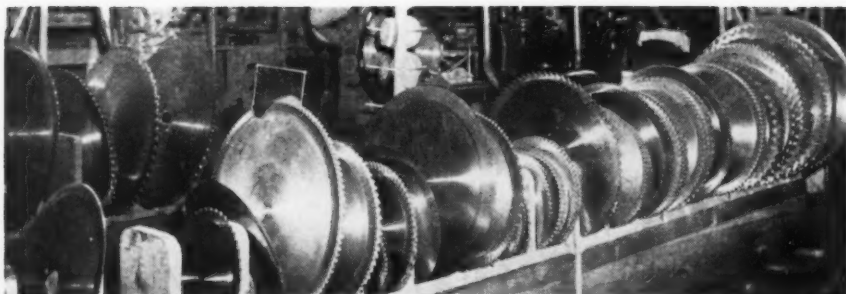


Fig. 1. Production of saws at the E. C. Atkins and Co., Indianapolis, is done on five production lines with all dust producing operations exhausted by type D or type N Roto-Clones.

struction work was completed in any portion of the new building. Unit dust control equipment permitted moving small groups of machines complete with their exhaust ventilation and allowed production to start as soon as equipment was installed.

While many dust producing operations in saw manufacturing are basically the same as in any metal working operation where metal is ground, polished and cleaned, other operations are peculiar to this industry and involve special consideration in hood de-

sign and dust control equipment selection.

With the view of maximum efficiency in flow of materials from raw stock to Shipping Department, the manufacturing area is laid out in five parallel manufacturing lines: the jobbing line, where miscellaneous work is handled; the circular saw line, where circular saws ranging from 3" to 108" in diameter are manufactured; the hand saw line; the cross cut saw line; and the hack saw blade and segmental circular saw line.

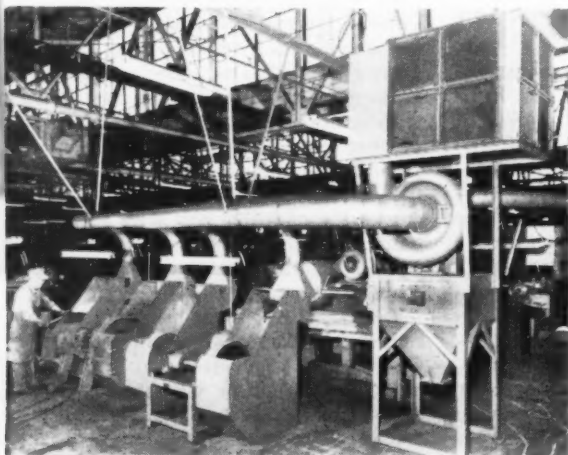
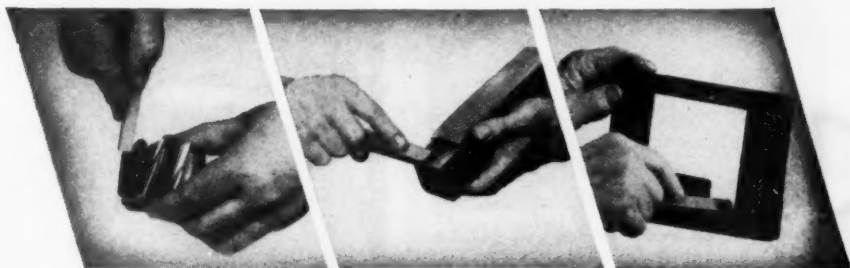


Fig. 2. Exhaust hoods designed for polishing wheels which rotate in either direction.

*You'll use them all over the shop!*



**NORTON**  
abrasives

## OILSTONE FILES



When you're fitting a die, deburring a machined part or putting that final, keen edge on a cutting tool, the right sized and shaped oilstone file is essential. It lets you get into those small crevices, holes and odd corners to do the job right and in quick time.

You take your pick of more than 200 different sized and shaped INDIA® and HARD ARKANSAS Oilstone Files. *And they're all file*—not just rows of individual teeth to wear down. INDIA electric furnace aluminum oxide is standard for general use, and the natural abrasive—HARD ARKANSAS—is the choice for final finishes and real precision work. *Only Behr-Manning offers this complete line of Natural as well as Manufactured Stones.*

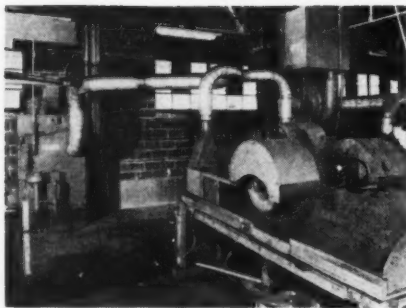
These descriptive folders tell the whole story. Write for them today. Address Dept. WD-11.



# BEHR-MANNING

TROY, N.Y.

ALSO COATED ABRASIVES FOR EVERY INDUSTRIAL NEED



**Fig. 3.** Sliding panel in this roll polisher permits handling different size materials.

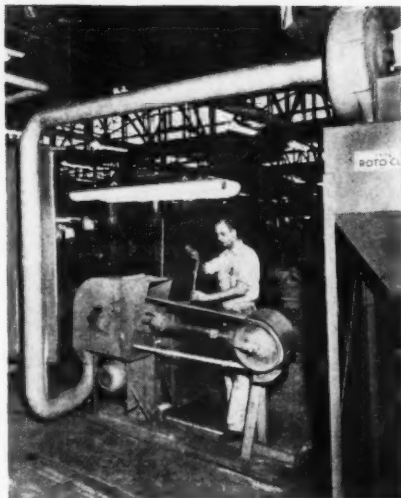
• • •

**Fig. 4.** Enclosure exhausted by 1000 cfm is provided for belt sander.

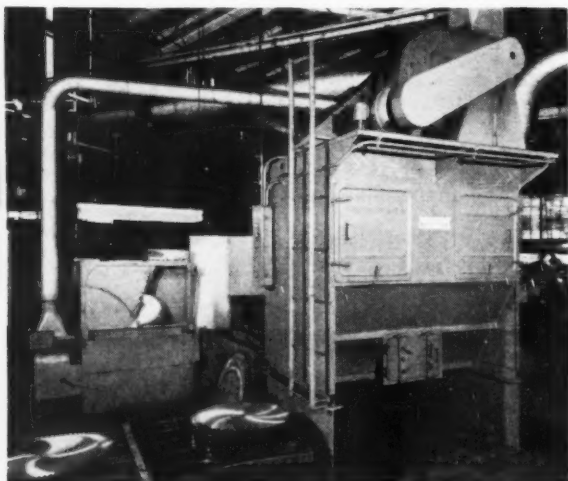
• • •

### Jobbing Line

Because of the wide variation of the parts polished on this line and the operation of the polishing wheels in either direction of rotation, exhaust hoods designed as shown in Fig. 2 were developed and proved effective. Each exhaust hood is connected to the main



duct leading to the Roto-Clone by a 12" branch handling 4100 cfm. Fig. 3 shows the hooding arrangement and design for the roll polisher. Since oiled abrasive, fed on to the stock in this operation, creates a possible fire hazard, the equipment is exhausted and material collected by a wet-type unit with 1000 cfm required on each of the two



**Fig. 5.** A counter-weighted, hinged cover on the face of the exhaust booth of this polishing station increases exhaust volume effectiveness.

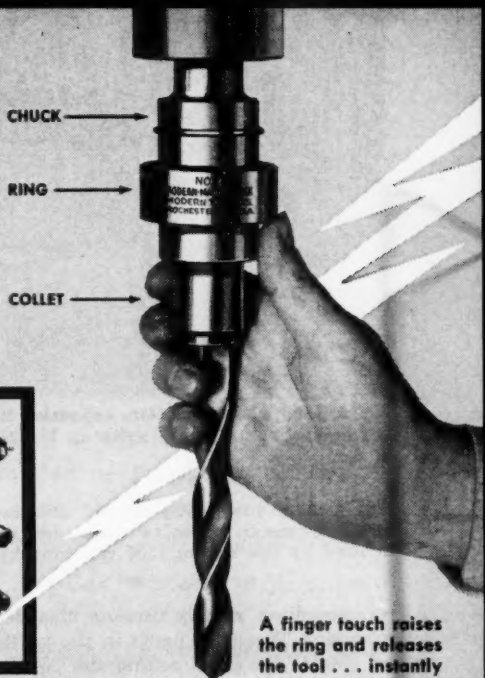
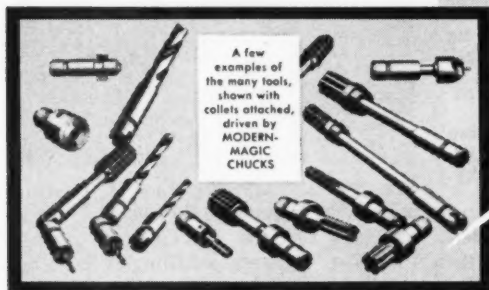
• • •



# Speed up your production

**Change tools without  
stopping . . . or even  
slowing the machine**

## **MODERN-MAGIC QUICK CHANGE CHUCK and COLLET EQUIPMENT**



**Modern Precision Tools  
Include . . . . .**

STATIONARY SELF-OPENING  
DIE HEADS  
ROTARY SELF-OPENING  
DIE HEADS  
STATIONARY  
COLLAPSIBLE TAPS  
ROTARY  
COLLAPSIBLE TAPS  
MODERN-MAGIC  
CHUCKS AND COLLETS  
SELF-OPENING  
STUD SETTERS  
INSERTED BLADE  
FACE MILLING CUTTERS  
SOLID ADJUSTABLE  
DIE HEADS  
ADJUSTABLE HOLLOW  
MILLING TOOLS  
UNIVERSAL CHASER  
GRINDING FIXTURES

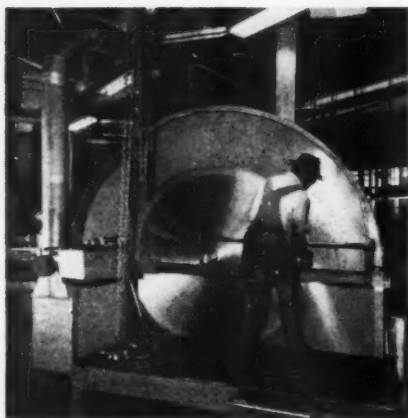
Modern-Magic Quick Change Chuck and Collet Equipment virtually eliminates costly lost time of revolving spindle machines. Used with such machines, tools are changed without stopping or even slowing the spindle. Changes are made from drill to reamer to tap instantaneously and safely while the machine is running at cutting speed. In this way, the Modern-Magic Chuck and Collet Equipment gives multiple spindle range to single spindle machines, increasing production and cutting cost. In high production shops, it has been proved they save time even though used only for changing from dull to sharp tools.

For full information, send for Bulletin M-103.  
In addition to standard Modern-Magic Chucks  
and Collets, it shows special types of each.

Only the ORIGINAL Modern-Magic Chuck and Collet Equipment carry the name  
"MODERN-MAGIC" and are manufactured by Modern Tool Works, Rochester, N.Y.

# MODERN TOOL WORKS

DIVISION OF  
CONSOLIDATED MACHINE TOOL CORPORATION  
ROCHESTER 10, NEW YORK



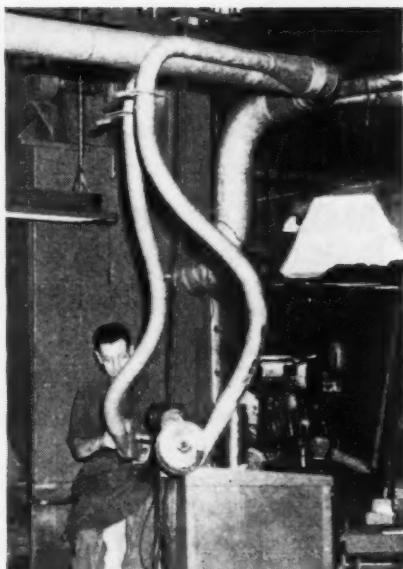
**Fig. 6.** This polishing station, exhausted by a wet-type unit, handles saws up to 108" in dia.

• • •

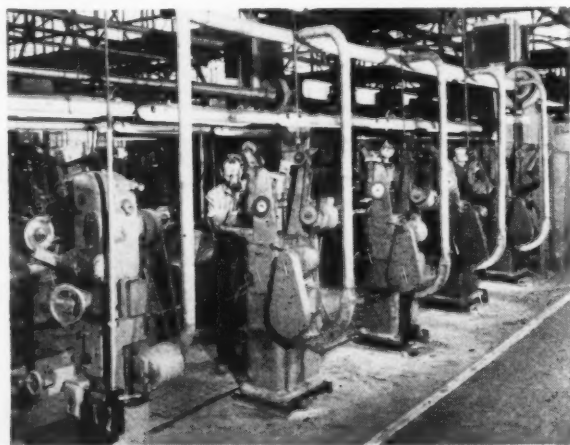
**Fig. 7.** Both saw polishing and finishing inside diameter of valve discs are exhausted by this unit of 2500 cfm capacity.

• • •

roll polishing wheels used in this department. The slide panel in the vertical side of the hood behind the polishing wheel permits adjustment of this opening for the different sizes of materials handled.



A typical enclosure for belt sanding operations exhausted by 1000 cfm was provided for the belt sander in this line, Fig. 4, where polishing is done on the top run of the belt. Additional units exhaust such metal dust producing operations as the tooth sharpening grinder for both metal and wood cut-



• • •

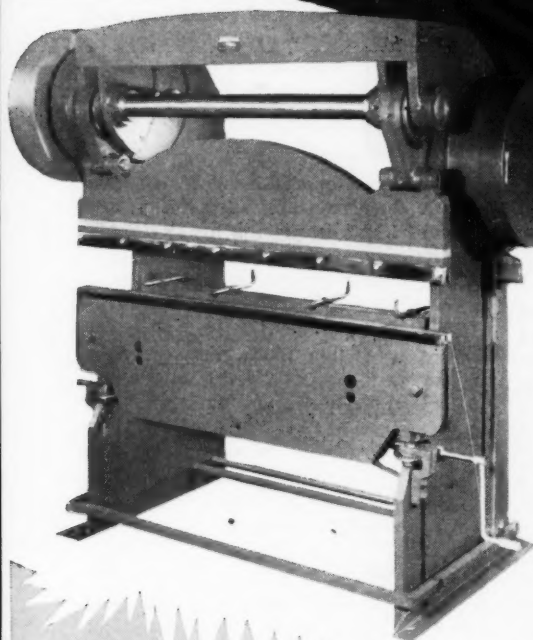
**Fig. 8.** Tooth grinding of segment saws is exhausted by four dry-type units.

• • •

# POWERFUL

## CHICAGO STEEL PRESS BRAKE

### TYPE "300"



A Press Brake made to exacting standards and built to take hard and continuous use.

This press will do your work well and efficiently.

Dependable service is guaranteed and proven by the thousands of years of operation.

Variable speed drive for speed and safety.

This is only one of the many fine presses made under the banner CHICAGO. There is a CHICAGO Steel Press Brake to meet your requirements.

Your die problems are ours — let us help you.

A POWERFUL, rugged, inexpensive Press Brake, designed and built to the standards of Chicago Steel Forming Presses.

Can handle 40 to 50 percent of the work done in the average plant, thereby releasing the larger Presses for heavier work. Can be used for Forming Embossing — Multiple Punching, Notching, Blanking, etc.

World's largest manufacturer of Steel Hand Bending, Power Bending and Power Press Brakes.

A dependable variable speed drive much desired by all users is standard.

## DREIS & KRUMP MANUFACTURING CO.

7440 LOOMIS BLVD. . . CHICAGO 36, ILLINOIS

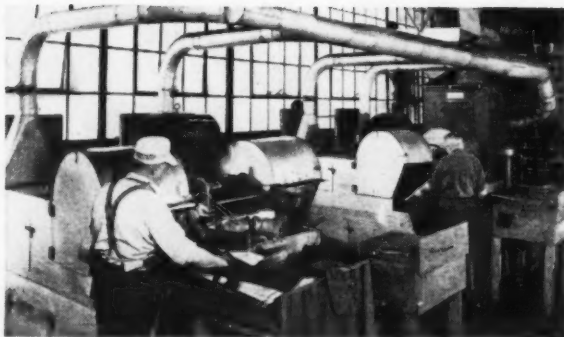


Fig. 9. Roll polishers are exhausted through specially designed hoods. 1000 cfm is exhausted from each hood.

ting saws, strip polishing machines, hard wheel hand polishing wheels and disc grinders for blade end squaring.

### Circular Saw Line

Two polishing stations are provided for polishing circular saws. Cordwood and wood saws up to 38" in diameter are polished as illustrated in Fig. 5. A counter weighted hinged cover on the face of the exhaust booth is closed after the saw is placed on the polishing spindle to increase the exhaust volume effectiveness. Large saws up to 108" diameter are handled at the polishing station illustrated in Fig. 6. Wet collection equipment was selected here also because of the possibility of fires from the polishing operation. The unit

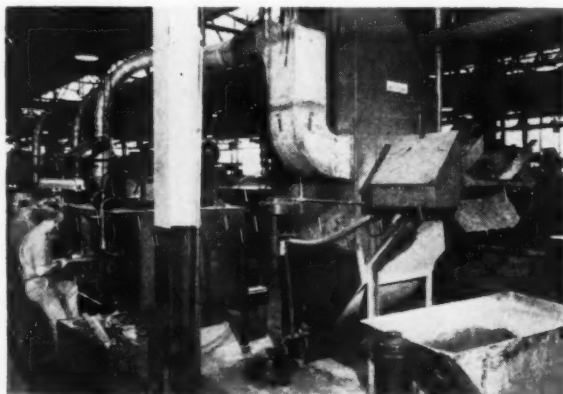
used on both operations exhausts 6000 cfm. A third saw polishing station and exhaust for finishing the inside diameter of valve discs are connected to a 2500 cfm unit illustrated in Fig. 7.

Tooth grinding of segment saws is exhausted by four No. 8 Type D Roto-Clones with five tooth grinders connected to each as shown in Fig. 8. Three additional units are used for tooth sharpening of solid circular saws in another portion of this line. Dust control is also provided for stand grinders, disc grinders, tooth sharpening and hand beveling operations.

### Other Lines

Much the same operations are conducted in the hand saw and cross cut

Fig. 10. Dust from sand blast cabinets is collected by units. Note collected dust being ejected to tote box.



# PROVED!

**Radial Relief Grinding gives up to 500% greater tool LIFE as result of better support at cutting edge**



ANGULAR RELIEF



RADIAL RELIEF

Available in hand operated and motor driven models for tool room or production use.



**D.S.**

**RADIAL RELIEF GRINDER**

Now, D.S. has simplified Radial Relief grinding. Made it a job for any good grinder hand by eliminating complicated set-up and computations. Grinds taps, center drills, reamers, counterbores, etc., one to 14 flutes.

D. S. GRINDER DIVISION  
ROYAL OAK TOOL & MACHINE CO.  
621 Fourth St., Royal Oak, Mich.

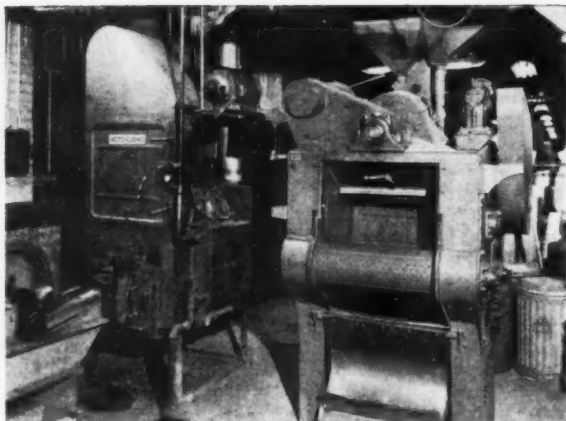
Gentlemen:

Please forward your D. S. Catalog.

Name \_\_\_\_\_

Address \_\_\_\_\_

City and State \_\_\_\_\_



• • •  
**Fig. 11. Wheelabrator used from inserted circular saw for removing forging scale teeth.**  
 • • •

saw lines. Six one-head roll polishers for cutout polishing and two two-head polishers for finishing polish are exhausted by wet-type units involving



the exhaust of 10,000 cfm. Fig. 9 shows how effective exhaust hooding can be designed for special polishing operations peculiar to this industry.

Four sand blast cabinets for cleaning scale from hack saw blades are exhausted by a wet-type unit at 4000 cfm. The collected fine dust is continuously ejected as mud by the flight conveyor included in the Roto-Clone settling tank as illustrated in Fig. 10. For the removal of forging scale from inserted circular saw teeth, a small Wheelabrator airless blast unit is used. The heavy loading and fine particle size of the scale removed prompted the selection of a wet-type unit shown in Fig. 11.

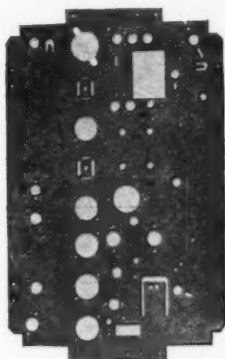
Smoke from oil quenching operations in heat treating also received ventilation attention with the collected oil laden smoke passing through a T-08-42" Cycoil oil bath air cleaner to collect oil particles. Prior to installation of the unit shown in Fig. 12 this exhaust vapor started deterioration of the asphalt felt roof and covered the outside of the building with a film of grease. The End.

• • •  
**Fig. 12. Smoke from oil quenching operations is exhausted through a TO-8 Cycoil for collection of oil particles.**



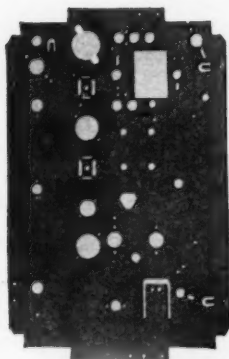
**SEE THE AMAZINGLY FAST  
PIERCING SPEEDS**

**OF THE  
WIEDEMANN RA 41-P  
TURRET PUNCH PRESS**



**A**  
**PIERCING TIME  
PER PIECE AS SHOWN  
6 min. 28 sec.**

Lot of 176  
3 Handling Operations  
Size  $8\frac{7}{8}$ " x 14" x .047 steel



**B**  
**PIERCING TIME  
PER PIECE AS SHOWN  
5 min. 43 sec.**

Lot of 1374  
3 Handling Operations  
Size  $8\frac{7}{8}$ " x 14" x .047 steel

Panels A and B are somewhat similar. After producing 176 pieces of panel A, engineering changes were made and incorporated in the template. Production was complete on Panel B.

**LOOK  
AT THESE  
TIMES!**

**Then see the  
RA 41-P in  
operation**

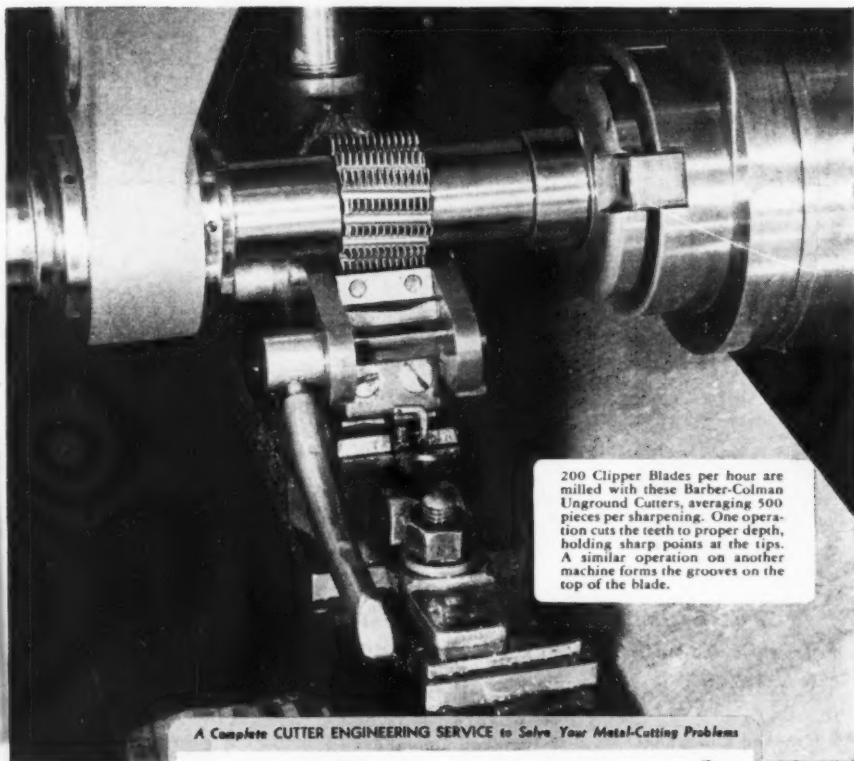
**WIEDEMANN MACHINE COMPANY**

**4265 WISSAHICKON AVE. • PHILADELPHIA 32, PA.**

# BARBER-COLMAN

## FORMED CUTTERS

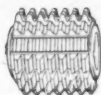
*Mill Deep, Fine Tooth Forms*



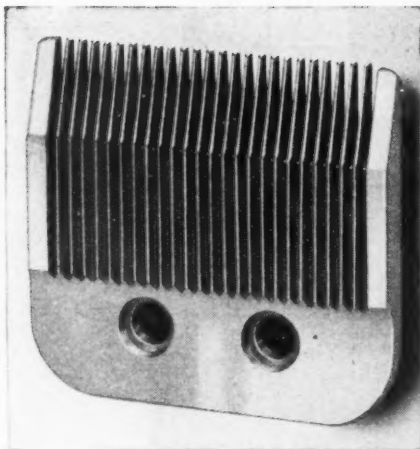
200 Clipper Blades per hour are milled with these Barber-Colman Unground Cutters, averaging 500 pieces per sharpening. One operation cuts the teeth to proper depth, holding sharp points at the tips. A similar operation on another machine forms the grooves on the top of the blade.

A Complete CUTTER ENGINEERING SERVICE to Solve Your Metal-Cutting Problems

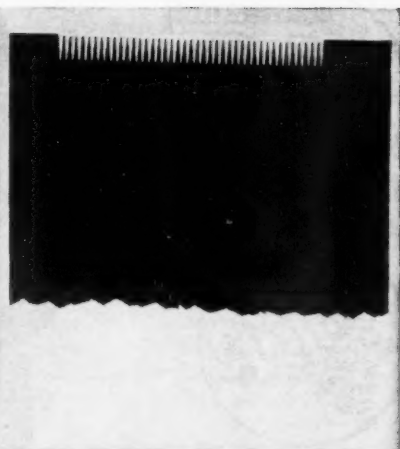
BARBER  
COLMAN



JOB-ENGINEERED DESIGN • FULL LINE OF STANDARD TOOLS • FIELD SERVICE



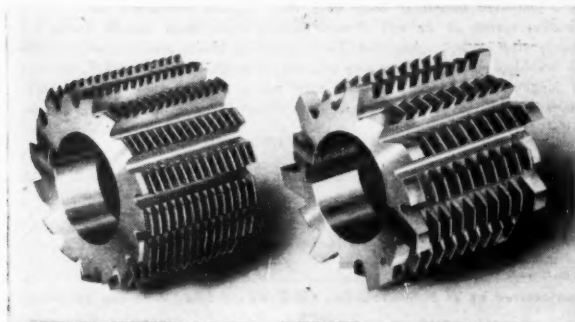
▲ Clipper blade showing depth of form, with teeth ranging from .012" to .018" thick depending on blade style. One operation cuts the teeth and a second forms the grooves on top of the blade. Other Barber-Colman cutters are also used to mill the angle, sides and back of the blade.



▲ Enlarged section of teeth indicates the cutter problems in milling long thin teeth with sharp tips. Cutters are designed with intermittent rows of teeth to give extra tooth strength and to assure uniformly sharp points. This design assures consistent accuracy and long life.

### **Cut Thin Sections...Hold Sharp Points With Maximum Accuracy and Production**

▼ Pitch of cutter teeth is held within .0005". Cutters are unground with straight or helical gashes. The pitch of one cutter must match the pitch of the other to assure absolute alignment of grooves with teeth on the blade. Barber-Colman design assures duplication of accuracy whether cutters are ordered in sets or individually at intervals.



FOR  
Those Tough Milling Problems

**YOU SUPPLY  
THE FORM!...**

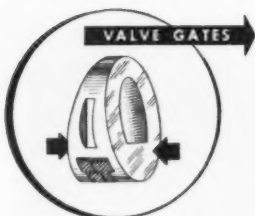
**WE'LL DESIGN  
THE CUTTERS**

TO  
COMBINE CUTS  
PROLONG TOOL LIFE  
SPEED OPERATIONS  
DUPLICATE ACCURACY  
MAKE THE JOB EASIER

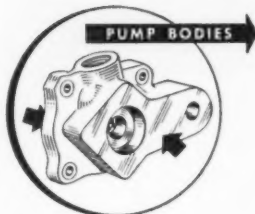
SEND BLUEPRINTS FOR QUOTATION  
TO DEPARTMENT MT.

# **.....Barber-Colman Company.....**

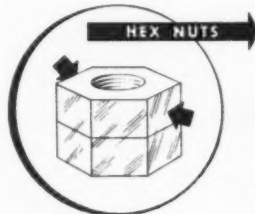
GENERAL OFFICES AND PLANT, 421 ROCK STREET, ROCKFORD, ILLINOIS, U.S.A.



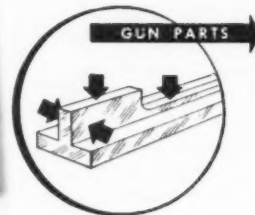
VALVE GATES



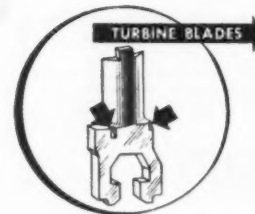
PUMP BODIES



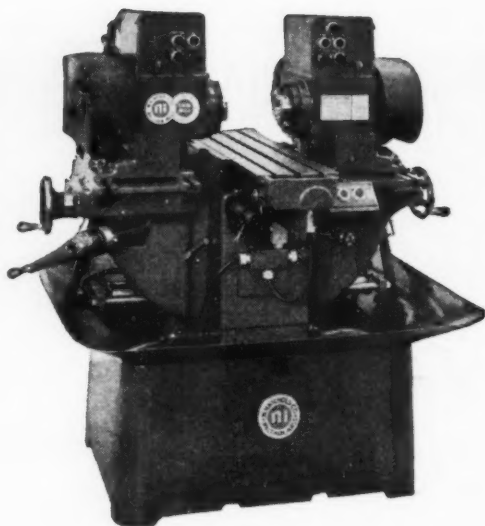
HEX NUTS



GUN PARTS



TURBINE BLADES



## on the NEW *Nichols* TWIN MILL

The TWIN MILL cuts milling costs in half on many jobs. It handles **TWO** milling operations at a time, yet requires but **ONE** fixture and **ONE** operator. Designed for the class of work usually assigned to Hand Millers or light Automatic Production Millers, the Twin Mill's speed, accuracy, and exceptional flexibility add up to increased output at lower cost. **New** Spindle Retraction automatically withdraws cutters at the end of each cutting stroke. **New** Spindle Brakes act instantly after cycle is completed. The Two Milling Heads are independent units with individual motor drives, quickly adjusted UP or DOWN, IN or OUT, or OFF-SET longitudinally. Machine handles short run or long run work economically. Automatic table cycle and entire machine push-button controlled. Write for details.

### CONDENSED SPECIFICATIONS

Table, working surface	8 1/2" x 30"
Table, travel—cutting stroke	11 1/4"
Motors	(two) 1 HP
Maximum height center of spindle above table	11 3/4"
Maximum offset of spindles (horizontal)	8 1/2"
Maximum distance between spindle noses (across table)	16"
Floor space required	64" x 56"
Spindle Speeds (15)	from 55 to 2050 R.P.M.

Manufactured by W. H. Nichols Co., 48-G Woerd Ave., Waltham 54, Mass.

Have you seen the new Nichols' movie, "The Miller That Uses Its Head"? It's available for showing in your plant.



Also available are NICHOLS Hand Millers, NICHOLS two-spindle millers with identical or opposed spindles, and with or without pneumatic feed.

Please address inquiries to

**NICHOLS-MORRIS CORPORATION** 50-G CHURCH ST.

Dealers in Principal Cities

NEW YORK 7, N.Y.

# Interesting

## JIGS AND FIXTURES DEVELOPED BY WESTERN MANUFACTURERS

By Frank Charity

The high productivity which western manufacturers must obtain to meet eastern competition has resulted in the development of many types of unusual jigs and fixtures. Some of these are described by the author.

Among the time-honored beliefs that have been permanently discarded by western industrialists is the contention that jigs and fixtures are suitable only for production work. Repeated tests have definitely established the fact that, in most normally-efficient shops, the greatest cost reductions can be achieved in tooling up; and that, whenever specific tools or tooling operations must be duplicated to any considerable extent, tooling jigs and fixtures can save time while permitting the fabrication of tools with the most consistently-desirable physical characteristics.

Probably the most remarkable of these "tooling tools" is the well-known master tooling dock developed by Leland A. Bryant for Consolidated Vultee Aircraft Corporation during the recent war. However, due to the fact that this device requires a high initial investment, a less-elaborate positioner known as the "tooling ways" is now achieving considerable prominence.

As indicated in figure 1, the principles of the tooling ways are fundamentally the same as the master tooling dock—i.e., in that it makes use of a sequence of straightedge components to locate

points in space. It is comparatively inexpensive because it does not require an elaborate superstructure or special foundation; yet, if its straightedge alignment is checked with sufficient frequency, it can maintain the .005" dimensional tolerances of its predecessor. Besides serving as a positioner for production jigs and fixtures, the tooling ways may be equipped with accessories for jig boring, tool proofing, contour mastering, and scribing.

Figure 2 shows another type of tooling tool—purpose of which is to facilitate the cutting of rod, tube, and pipe sections for jigs and fixtures. It is simply a holding device with adjustments to permit the insertion of different types of stock for cuts at varied angles.

Metallizing Company of Los Angeles has developed the jig shown in figure 3 to speed the duplication of production molds by metallizing with alloy-spray equipment. It is essentially a horizontally-rotating wheel, operated with an electric motor and equipped with attachments fittings for various types of patterns. Its rotations permit the uniform buildup of a mold cavity without requiring the constant atten-

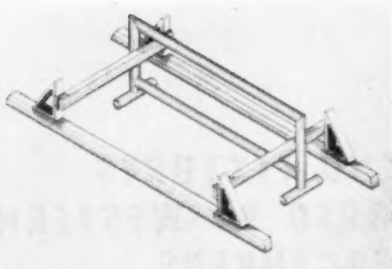


Fig. 1. Schematic diagram of the "tooling ways." A rough picture-frame fixture is shown in line with the straight edges.

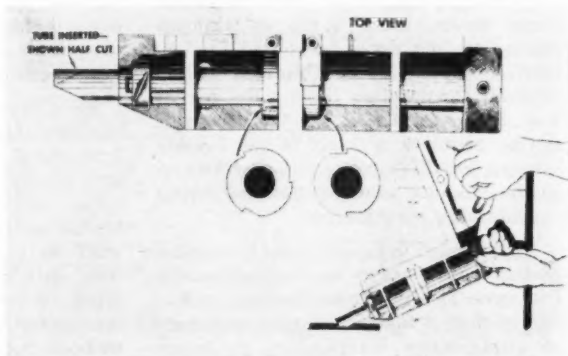
tion of a metallizing technician.

### Parts—Fabrication Tools

For basic fabrication operations, the current tendency is to lower costs by developing individual jigs or fixtures which will efficiently serve two or more purposes.

Figure 4 shows a combination fixture which has been used in assembling, drilling, and trimming contoured sheet metal parts. It comprises a metal frame and a wood base, both shaped so that they can "sandwich" the subject parts. Holes are drilled in the parts through bushings in the frame, after which the parts are routed along the edges of the base and the frame is removed to permit assembly of the parts by riveting and bolting.

Fig. 2. Schematic diagram showing components used to facilitate the cutting of rod, tube, and pipe sections for production jigs and fixtures.



For the rapid fabrication of precision leather packings and synthetic rubber packings, Searle Leather & Packing Company has developed the pneumatic jig shown in figure 5. Operationally, it is similar to a punch press. It is powered by a two-ton Westinghouse air cylinder, and its function is to apply compressive forces via a ram-and-die setup so as to give the aforementioned packing materials their final form.

Pictured in figure 6 are structural details of a small tube-bending fixture, which is economical from both tooling and production viewpoints when varied types of bends must be produced in light-gauge metal tubing. Except for bolts and related fittings, all parts are made from wood. Adjustments for different sizes of tubing are made by means of the axle-bolt which supports the bending wheel, and variations in bending action are achieved simply by regulating the movements of the handle.

When successive drilling and boring operations are requisite, jigs of the type shown in figure 7 are particularly popular. In the illustrated tool, components were made from lightweight alloys to facilitate handling; standardized clamps hold the work (of which the foreground die casting is a specimen) and appropriately-sized slip bush-



## How to Drill Small Holes Fast and, With Precision

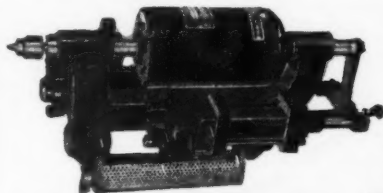
This prominent manufacturer of pumps for oil burners has been using Speed-Right Drill Presses for the past six years. His requirements include both precision and high production. Three of these machines are in use for drilling various holes in end plates, etc. One of the most useful features to this manufacturer is the variable speed adjustment. There are others. For instance:

### PRECISION BUILT FOR PRECISION PERFORMANCE

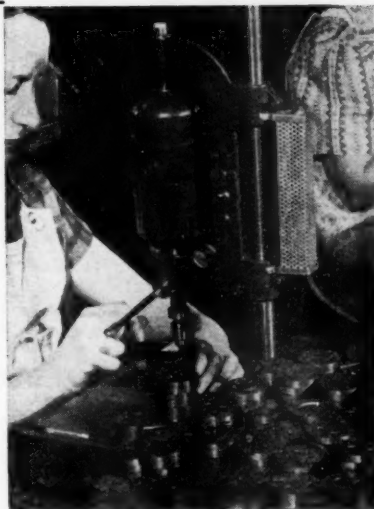
These machines have been designed exclusively for profitable and accurate drilling of small holes, .004" to .125". Small precision spindle bearings and wide quill yoke minimize side play. Drills are held accurately in a selected small chuck. Direct drive variable speed spindle provides speeds from 1,000 to 10,000 or 2,500 to 15,000 RPM.

### Available With Air or Hand Feed — Variable Spindle Speeds

Shown below is the 8 inch model with air feed and hydraulic control.



THE ELECTRO-MECHANO CO.  
263 EAST ERIE STREET  
MILWAUKEE 2, WISCONSIN



Operation view of 8" Speed-Right Drill Press

### Speed-Right 16" Drill Press

A rugged precision tool room drill press. Designed for fast, accurate set-ups. Instant variable speed 300 to 5,000 RPM. Back gears for slow speeds. Built-in ball bearing motor.



Free Culletin on Speed-Right precision drill presses will be sent upon request. Ask for bulletin BB-251.

STANDARD AND SPECIAL  
PRECISION DRILLING MACHINES  
TACHOMETERS



Fig. 3. This photo shows a rotating jig which has been used to speed the duplication of molds and dies by metallizing.

ings serve as guides for the respective cutting tools.

### Assembly Devices

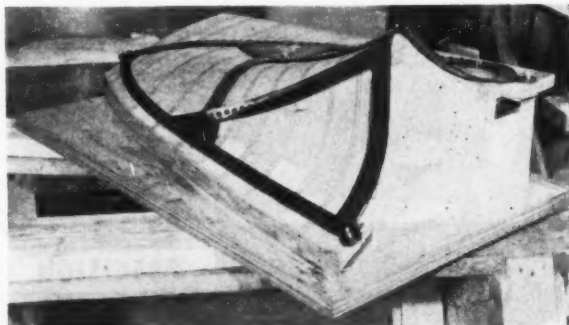
In the design and construction of jigs and fixtures for assembly work, the principal objective normally is to obtain tools with which individual workers can rapidly and easily accomplish all of the operations required to assemble specified groups of parts.

When riveting is the required method of assembly, this goal normally seems difficult to attain; but, with tools of the type shown in figure 8, a number of western factories are now able to turn out riveted assemblies without first training pairs of workers to operate as teams. The illustrated fixture is in most

respects a standard device with formers to which sheet metal parts are attached with suitable clamps. It differs from similar tools only to the extent that it has been equipped with automatic bucking bars—i.e., conventional steel strips supported by spring-reacting mechanisms so that they will automatically vibrate and produce driven heads on assembly rivets which are inserted and hammered from the other side of the fixture by a pneumatic gun operator.

In order to shield assembled electrical wires, it is customary to apply rubber or plastic insulation materials by molding and heat-sealing methods—which are quite satisfactory for the

Fig. 4. Combination fixture for contoured sheet metal parts.



# Baldor

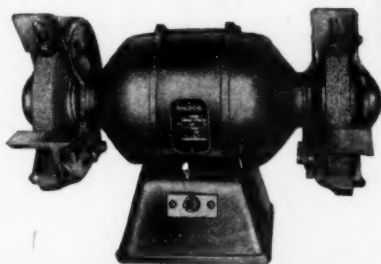
## Grinders you can't **OVERWORK**



The  $\frac{1}{2}$  hp motors that power these Baldor Grinders have no commutator, no centrifugal switch, no brushes—really trouble-free motors that will not burn out even when over-loaded repeatedly. Electronically balanced with 1/50 ounce of perfection, the armatures rotate at 3400 RPM without vibration—an engineering achievement that makes true precision work possible. Only first-grade wheels are used, and we re-check these at our plant for balance; Baldor Patented Balance Flanges are added when necessary. These grinders are built to do precision work and take plenty of punishment at the same time.

ABOVE: Carbide Tool Grinder with reversible motor for sharpening both left and right hand tools. ....\$131.40

Phone your industrial distributor now or clip this ad to your letterhead and mail for grinder bulletins.



ABOVE: No. 8100 Grinder. 60 cycle, 1700 rpm motor, 8" x 1" first-grade wheels. (36 and 60 grit.) Heavy shaft,  $\frac{3}{4}$ " arbor. ....\$80.00

### BALDOR ELECTRIC COMPANY

Motors - Grinders - Battery Chargers

4368 Duncan Ave.

St. Louis 10, Mo.

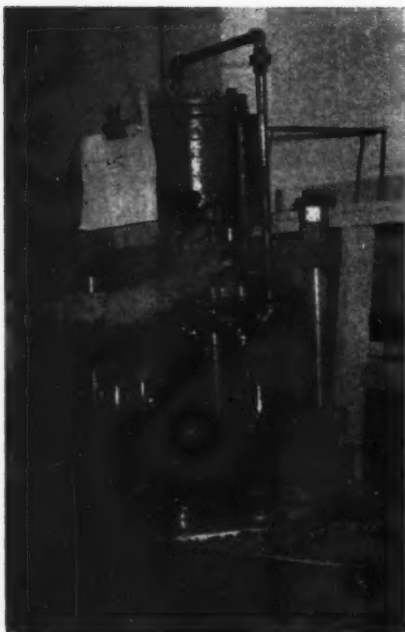


Fig. 5. Pneumatic jig for the fabrication of leather and synthetic rubber packings.

• • •

Fig. 6. Tube-bending fixture.

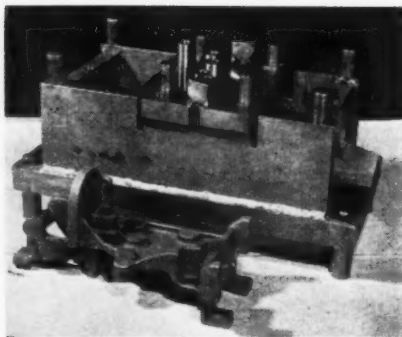
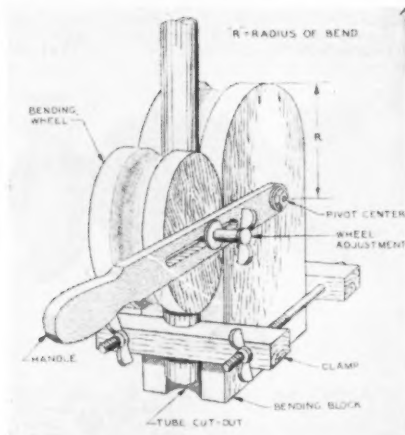


Fig. 7. Jig for drilling and boring operations.

• • •

large manufacturer who can afford an extensive outlay of mass-production machinery and equipment. But when this type of work must be accomplished in a small shop, or on a limited-production basis, manufacturing costs normally zoom. Therefore, Industrial Research Associates of Portland feel that they have solved a particularly knotty problem by designing the fixture whose use is illustrated in figure 9. It eliminates the need for expensive machines and equipment by permitting wire assemblies to be insulated with prefabricated rubber or plastic tubes.

Where rubber and metal parts must be heat sealed in the assembly process, as in the manufacture of diathermy equipment, the jig shown in figure 10 has been used with particular success. Developed by engineers of Birtcher Corporation, it has a sequence of manually-operated spring clamps which

#### REPRINTS AVAILABLE

Extra copies of the report on Automatic Screw Machines or the MAPI Replacement Formula are now available in reprint form. Address: MACHINE and TOOL BLUE BOOK, 222 E. Willow Ave., Wheaton, Ill.

# The **PLUG GAGE** of *TODAY* **DuBo**<sup>\*</sup> with High Visibility **COLOR FLASH** — Handles



**A**lready recognized as the leading bore checking gage of the fixed limit type, **STANDARD DuBo Gage** NOW brings you even more positive color identification of the "go" and "not go" members. Single end gages, sizes 1.510" to 6.010", are now furnished with solid red or green plastic handles. Double end gages, sizes .240" to 1.510", have large red and green bands on a handle redesigned for even greater speed and efficiency in use. No fumbling, no confusion, with these new DuBo Gages.

Double end  
DuBo Gage  
for small  
size bores



\*U.S. and  
Foreign  
Patents  
Granted

## And of course . . . all of DuBo's other advantages:

**DEFINITE CHECK:** No borderline cases with DuBo. Whether or not handle drops freely below center is definite yes-or-no answer.

**LIGHTNESS IN WEIGHT:** As much as 70% to 80% lighter than a cylindrical plug gage of equivalent size.

**SELF-PILOTING:** Utter ease of entering is a real and definite time-saver. Relieves nervous strain of fussy positioning.

**LONG WEAR-LIFE:** Outlast ordinary cylindrical plug gages many times and maintain accuracy throughout exceptionally long life.

*It all means effective gaging WITH economy.*

**STANDARD GAGE CO., Inc., Poughkeepsie, N.Y.**

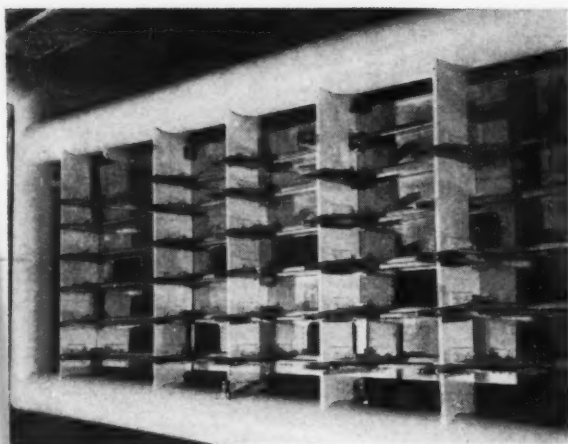


Fig. 8. Sheet metal assembly fixture with automatic bucking bars.

holds the requisite parts to a flat steel plate. Heat is applied via the plate, as necessary, by means of thermostatically-controlled heating elements.

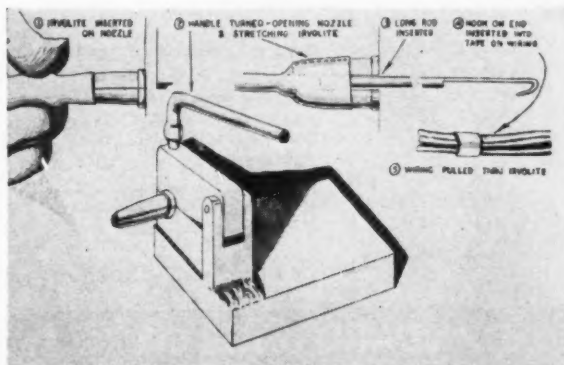
### Finishing Tools

Electronic controls and automatic conveyor equipment are achieving particular prominence in connection with the jigs and fixtures used for finishing purposes—not only because they reduce manpower requirements, but because they facilitate the attainment of precision controls which are

essential to consistently first-quality finishing work.

For example, with the electronic control setup shown in figure 11, one man can now operate a "department" at Z-Nickel Company of Los Angeles. The controls on the panel regulate the movements for jig-conveyors, so that the latter can automatically load and unload a dozen full-sized electroplating tanks. Since the jig-conveyors are loaded and unloaded by another department, the panel operator's job is principally a matter of pushing buttons and watching instruments to make sure

Fig. 9. Inexpensive fixture for insulating wire with prefabricated rubber or plastic tubes.





**Tell Us Your Production Problems...**

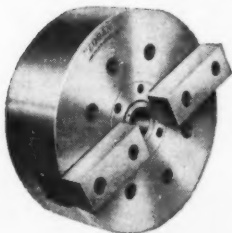
**"LOGAN"**

**Air and Hydraulic  
Power-Operated**

**CHUCKS**

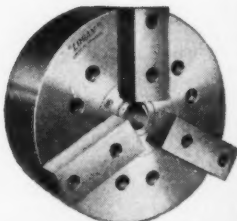
**with open or closed center**

- American Standard or Logan Standard jaw locks.
- American Standard spindle nose adaptation.
- Accurately machined.
- One-piece steel body.
- Operating parts protected by pressure lubrication.



**Two-jaw,  
combination  
type**

**Three-jaw,  
universal  
type**



**We'll Help You  
Solve Them**

**Logan Manufactures  
6,975 Standard  
Cataloged Items**

**Free Catalog On Request**

**AIR CONTROL VALVES**

CATALOG 100-4

**AIR CHUCKS**

CATALOG 70-1

**AIR CYLINDERS**

CATALOG 100-1

**AIR and HYDRAULIC PRESSES**

CATALOG 200-2; ALSO 80-2

**COLLET GRIP TUBE FITTINGS**

CATALOG 44

**HYDRAULIC CONTROL VALVES**

CATALOG 200-4

**HYDRAULIC CYLINDERS**

CATALOG 200-2; ALSO 80-2

**HYDRAULIC POWER UNITS**

CATALOG 200-1

**SURE-FLOW COOLANT PUMPS**

CATALOG 62

Let Logan Engineers  
help you design your Air  
and Hydraulic Circuits.

**Logan**

*Air and Hydraulic Equipment*

LOGANSPORT MACHINE CO., INC.

803 Center Ave.  
Logansport, Ind.

**SAVES**  
• TIME  
• EFFORT  
• MOTION

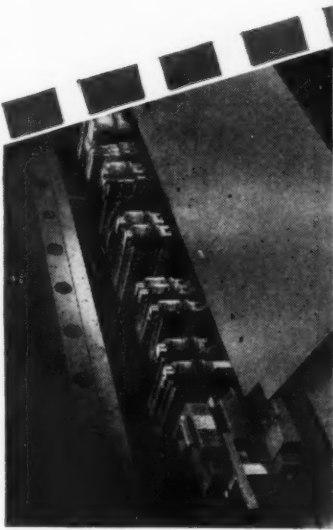
**FLUID POWER SPECIALISTS SINCE 1916**

*Punching 3/8", 1/2", 3/4" thick mild steel?*

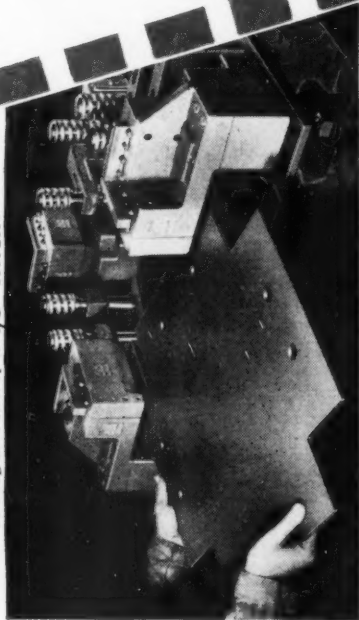
**THERE ARE WALES HOLE PUNCHING  
UNITS TO DO THE JOB  
AND NOTCHING UP TO 1/4" THICK MILD STEEL**

● Only America's most complete line... the Wales Line... can provide the exact *standard* hole punching unit required for any thickness of metal up to 1/2" thick.

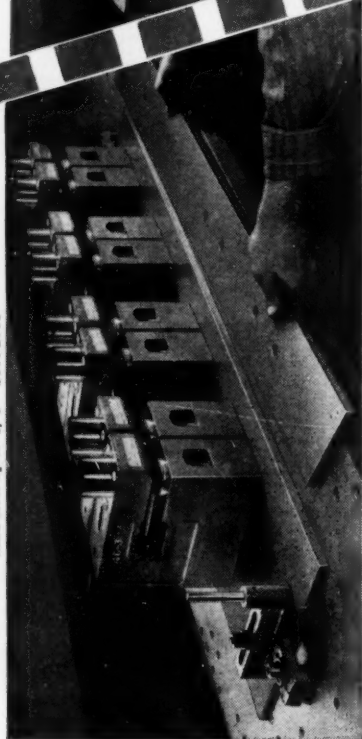
In most applications, hole punching and notching may be accomplished in the same operation on both stamping presses and press brakes. Wales independent, self-contained units which hold the punches and dies in permanent alignment permit set-ups to be made outside the press and placed on press bed reducing expensive press "downtime" to



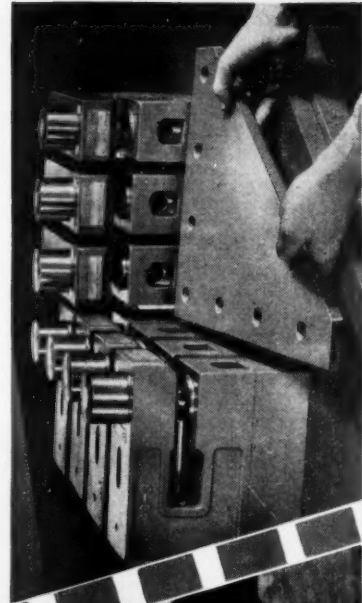
Showing Wales Type "BL" Hole Punching and Type "N" Notching Units in a combination press brake set-up for punching and notching mild steel up to **1/8" THICK.**



A stamping press set-up of Wales Type "CJ" Hole Punching and Type "NJ" Notching Units for punching and notching mild steel up to **1/4" THICK.**



Showing a set-up of Wales Type "G" Hole Punching Units in a press brake for punching mild steel up to **1/2" THICK.**



Same Wales Type "G" Units as shown at left in a stamping press set-up for punching mild steel up to **1/2" THICK.**

Wales self-contained Units.

The *multiple* time-saving, money-saving advantages of Wales Hole Punching and Notching Equipment is too BIG a story to tell in this space, so write for fully-illustrated, functionally colored catalogs TODAY.

## WALES-STRIPPIT CORPORATION

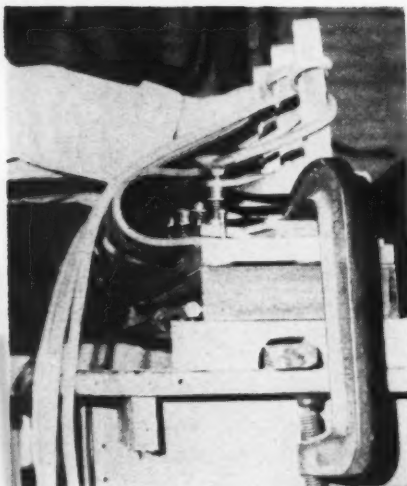
GEORGE F. WALES, *Chairman*

396 PAYNE AVE., N. TONAWANDA, N. Y.

*(Between Buffalo and Niagara Falls)*

WALES-STRIPPIT OF CANADA, LTD., HAMILTON, ONTARIO

**Specialists in Punching and Notching Equipment**



**Fig. 10. Jig for heat sealing metal and rubber parts assemblies.**

• • •

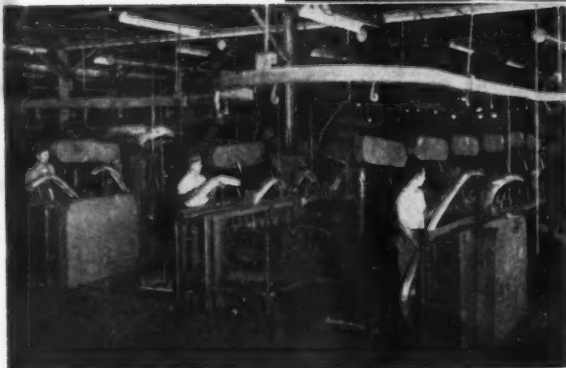
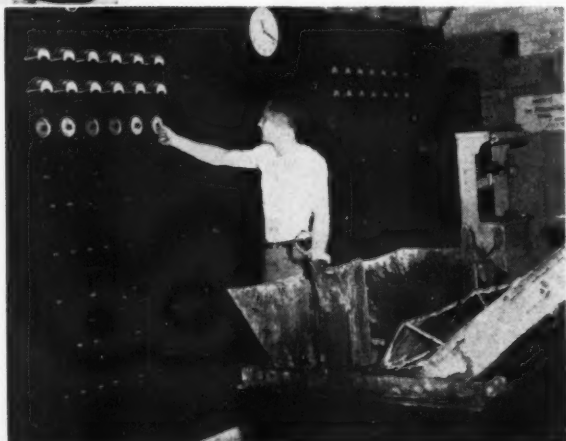
no operational discrepancies will be unnoticed. Because each plating operation is electronically timed, the dimensional tolerances of plated finishes can be controlled for accuracy of .001 inch or less.

Figure 12 shows a jig-conveyor setup with which automobile bumpers are polished at U. S. Spring and Bumper Company. Personnel are required only to load and unload the conveyor jigs at the ends of each line. Abrasive and finish-buffing work is done automa-

• • •

**Fig. 11. Electronic control panel for jig-conveyor set-up at Z-Nickel Company of Los Angeles.**

• • •



• • •

**Fig. 12. Jig-conveyor set-up for polishing automobile bumpers.**

• • •



Fig. 13. Power saw equipped with safety fixture.

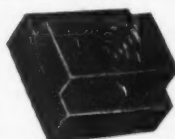
tically by machines along the conveyor lines.

### Safety Devices

Many of the jigs and fixtures now utilized in western factories are not directly concerned with either tooling or production work, their principal functions being to prevent accidents among workers. However, progressive executives believe that these tools are doing more than anything else to increase plant efficiency—simultaneously minimizing compensation payments and keeping a maximum number of trained workers on the job at all times.

Typical of these tools is the power-saw guard fixture shown in figure 13. It is simply a spring-reacting metal shield, against which work must be pushed before the cutting edge is exposed, and it was made to order at a total cost of about \$25. The End.

SEND FOR FREE CATALOG TODAY



T-NUT & STUD SETS  
STEP BLOCK SETS  
PUNCH PRESS SETS

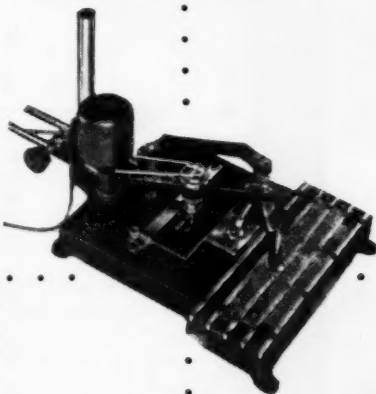
QUARTER TURN SCREWS  
SHOULDER SCREWS  
DOUBLE END JIG FEET  
SCREW TYPE JIG FEET  
PRESS TYPE JIG FEET  
FLANGED NUTS  
CUT THREAD STUDS  
TEE-NUTS  
COUPLING NUTS  
ADJUSTABLE STEP BLOCKS  
STAR TYPE HAND KNOBS  
HEXAGON TYPE HAND KNOBS  
KNURLED HEAD SCREWS

**Northwestern**

1118 HOLLIER AVE., DAYTON 3, OHIO

# Compare for results! Compare for price!

and you'll choose  
the **GREEN**  
**ENGRAVER**



The Green Engraver offers great speed and convenience. Quickly cuts up to four lines of letters from 3/64" to 1" on curved or flat surfaces whether made of metal, plastics or wood . . . operates by merely tracing master copy—anyone can do an expert job. Special attachments and engineering service available for production work. Just the thing for radio, electronic apparatus and instrument manufacturers.

For quality engraving on

- Panels • Name Plates • Scales • Dials
- Lenses • Molds • Instruments
- . . . also does routing, profiling and three dimensional modeling.



**GREEN**  
**INSTRUMENT CO.**  
386 Putnam Ave.  
Cambridge, Mass.



# HELLER

## NUCUT WAVY TEETH FILE

Reg. U. S. Pat. Off.

Pat. No. 2027039

... it's different

... it's patented

... it's the only file that gives  
double-duty filing action

It's the patented Heller Nucut "Wavy Teeth" feature that makes the difference. This cut-and-smooth two-in-one filing design incorporates two sets of *scientifically* positioned teeth — one coarse, the other fine.

With every stroke of a Nucut, the coarse teeth take deep, clean, uniform cuts. The fine teeth leave a smooth finish — just as though TWO files were working instead of ONE.

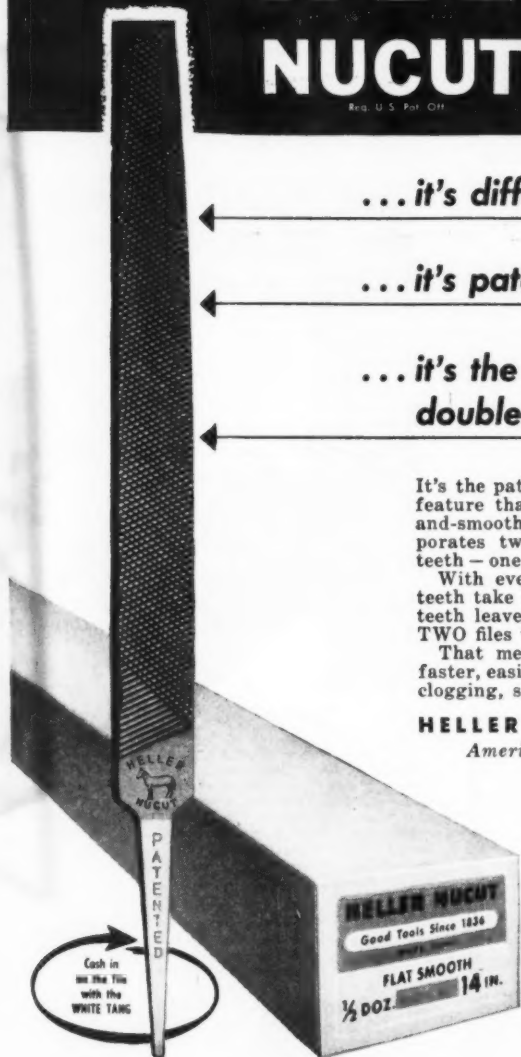
That means you can remove more metal faster, easier, and get a smooth finish without clogging, skidding or scraping! Write!

### HELLER BROTHERS COMPANY

America's Oldest File Manufacturer

Newcomerstown, Ohio

Ask also about our COMPLETE LINE of Swiss Pattern, Vixen Milled Curved-Tooth and Rotary Files, Rasps, Carpenters', Machinists', Tinnerns', Upholsterers', Bricklayers', Tilesetters', Blacksmiths' and Farriers' Hammers. Also Bricklayers' and Plasterers' Trowels, Crafts-master Scrapers, Chisels, Punches, Masterrenches and other quality tools.



Cash in  
on the file  
with the  
WHITE TANG



# \$100

## "DE-STA-CO" CLAMP INVESTMENT

saves  
over

# \$5000

each shift  
per year

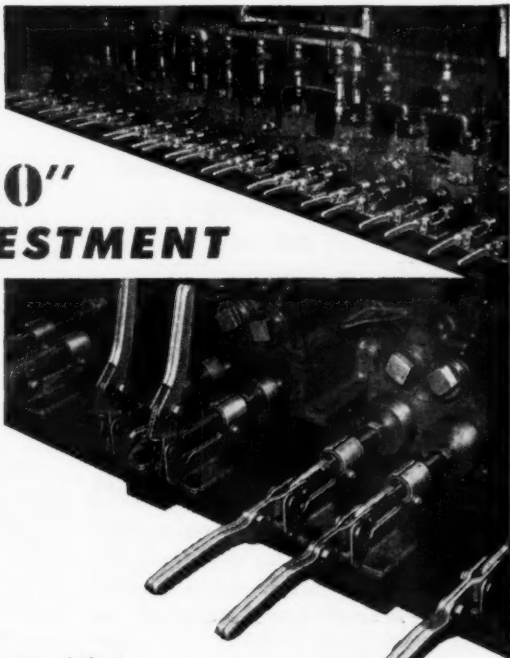
A saving of 12 man-hours per shift is reported by **Ross Operating Valve Company** with this fixture, built around 24 "De-Sta-Co" Model #620 Toggle Clamps.

The fixture holds **Ross** 4-Way air operating valves during a "run-in" operation. The clamp plungers are tipped with rubber grommets which seal exhaust and intake ports during the "run-in," after which the valves are torn down and inspected carefully. Besides the actual saving in man-hours, these "De-Sta-Co" Toggle Clamps convert a tedious setup job into one quickly and accurately performed by less highly-skilled labor.

For your problem in production work-holding there's a "De-Sta-Co" Toggle Clamp that assures increased efficiency, accuracy and savings. Whether you're machining, welding, gluing, bonding, inspecting or assembling, you do it faster . . . and cheaper . . . with "De-Sta-Co" Toggle Clamps. Our catalog describes more than 40 fixture and portable models, holding capacities over 2500 lbs. Write for your copy today, and name of nearest "De-Sta-Co" distributor.

**DETROIT  
STAMPING  
COMPANY**

**347 MIDLAND AVENUE  
DETROIT 3, MICHIGAN**



Photos courtesy  
Ross Operating Valve Co.  
Detroit, Mich.

# MORE HOLES PER HOUR — PER DOLLAR

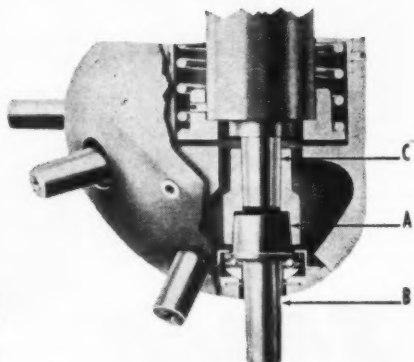
Increase production of any standard drilling machine by adding a Lign-o-matic, the only drill turret with the patented, self-centering principle that guarantees sustained accuracy equal to the drilling machine itself.

## FOR ALL CONSECUTIVE DRILL PRESS OPERATIONS

### PROVED PRODUCTION INCREASE

— Turret indexes faster than tools can be changed or work moved to another spindle. A single Lign-o-matic will release 5 drilling machines for other work and still show increased production and reduced costs on original job.

**VERSATILITY**— Fits any standard drilling machine without altering the machine. Handles operations such as drilling, reaming, counterboring, and tapping (on reversible spindle machines), up to 1/2" diameter in any material.

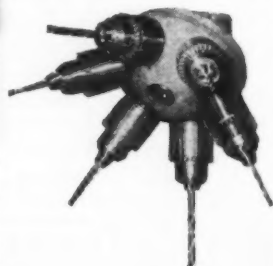


**PRECISION** — Patented, self-centering tapered drive (A) automatically locks turret spindle (B) into exact alignment with drilling machine spindle (C) for sustained accuracy.

**GUARANTEE** — May be returned in 10 days for any reason for full refund of purchase price. Two-year guarantee against defective parts.

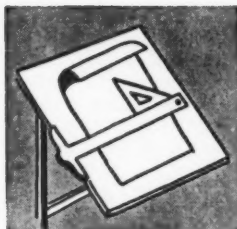
**PRICE** — Model D, 6 spindles with No. 2 Jacobs male taper ..... \$235.00  
Chucks extra at established prices.

**DELIVERY** — Currently, 2 weeks.



- ☐ Please rush ..... Lign-o-matic turrets for  
(drill press make)..... (size).....  
(quill dia.)..... (spindle taper).....  
My name.....  
Title.....  
☐ Please send literature on Lign-o-matic turret.  
(Attach coupon to company letterhead)

**HOWE & FANT, INC.**  
525 FLAXHILL RD., SO. NORWALK, CONN.



## Shop Hints

### Boring Fixture for a Machine Detail

Robert Mawson

In order to be efficient a boring fixture must possess the following features: it should locate the piece positively and it should hold the work-piece securely. If the tool does not have these two principles the machined surfaces will not be interchangeable. It is also good policy to design the fixture with a rugged construction to prevent distortion of the piece during the machining operation.

In figure 1 is shown a detail used on a line of manufacturing machines made of cast iron, and known as a Center Drive Shaft Bearing. During the production of these machines many special machining tools and equipment are used for at least two reasons: the desire to manufacture at the lowest cost and also to obtain interchangeable details. By this procedure the initial machining cost is reduced but what is almost a necessity the obtaining of repair parts to supply the various mills, where the machines are in service, ready to be installed and placed into service quickly.

The first operation when machining this detail is drilling and boring the hole B and facing the sides of the two bosses. The next process is facing the upper surface of the flange C, facing the boss D, rough and finish boring the center holes, facing the pad A and countersinking the hole at the upper surface. The fixture used when performing these latter operations is illustrated in figure 2.

This fixture is made with a machine

steel circular base A. A rectangular plate of machine steel B is then welded to the base and also two machine steel braces F. On the inside surface of detail B is also welded a rectangular plate of machine steel E. In the plate B is now accurately bored a 1¼ inch hole C. At the upper end of the plate is also machined a 1½ inch by ⅜ deep slot D. In this slot is fastened a machine steel, case hardened, locating block G with two machine steel threaded studs H each being attached to the block with a steel hexagon nut. In the center of the block is placed a steel dowel pin to hold the assembly in proper alignment. The lower surface of the circular base is next ground to be square and in alignment with the locating block.

A machine steel, case hardened, holding block J is provided to slide over the studs H and on the outer threaded portion of the studs are hexagon nuts. In the hole C and detail E is fastened, with a steel washer and hexagon nut, a tool steel, hardened and ground, locating pin K. This pin is ground to have a good sliding fit in the hole B (figure 1).

In the center of the base is bored a hole in which is placed a machine steel, case hardened, plug L. This plug is machined to be a good sliding fit in the hole of a Bullard-B.V.5 Vertical Boring mill on which the machining operations are performed.

To use the Boring fixture: The fixture is first located on the machine by placing the plug L in the center hole

of the machine table. The fixture is fastened in place by tightening the nuts on three T-bolts which have been placed in slots in the table and the notches in the circular base.

The holding block **J** is next taken from the fixture after the nuts on the

studs **H** have been removed. One of the Center Drive Shaft Bearings, to be machined, is then placed in the fixture being located on the pin **K** and resting in the vee surface of the locating block **G**. The holding block is now returned to position by placing it on the studs **H**.

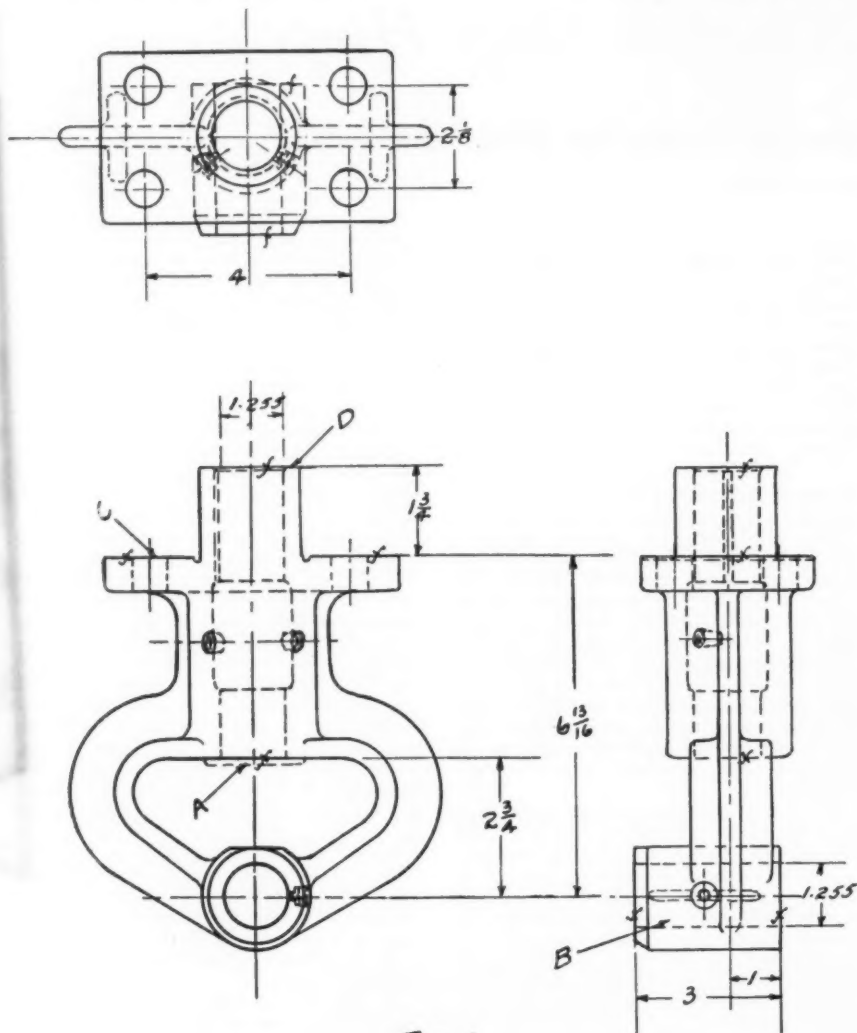


Fig 1.

# MARK IT FOR MARKET!



**CLEAN ... LEGIBLE ... PERMANENT ...**

MODEL  
175  
HYDRAULIC



Identification **ROLLED** into your products will help you market them.

Hack Saw blade above has been permanently marked in a Model 175 Hydraulic Marking Machine using a solid engraved lettering knurl.

Your name, model number, part number, serial number or decorative designs can be rolled into your components to improve their appearance and facilitate identification. Send prints of parts, showing required marking and its location on part with hourly production for free recommendation.

**WRITE FOR CATALOG**

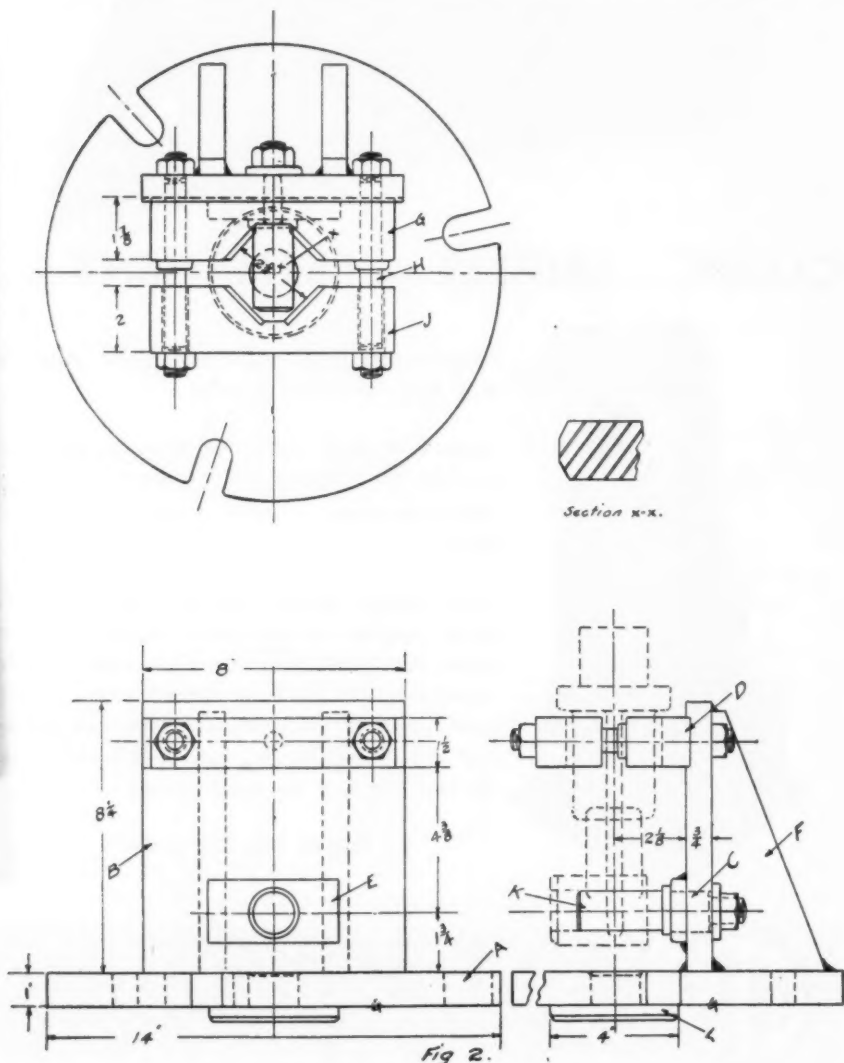


**GEO. T. SCHMIDT, INC.**  
1802 W. BELLE PLAINE AVENUE  
CHICAGO • 13 • ILLINOIS

After the nuts have been placed on the studs they are tightened. This action forces back the block J and holds the workpiece securely in position in the V-surfaces of the blocks G and J. The workpiece is then accurately positioned

and held securely for the machining operations.

The machine is then started in operation, the facing tool in the cross slide is adjusted to the correct position and the surface C (figure 1) is machined. The





*Try  
It  
Free*

MODEL DL 7055D  
MUFFLE 18x18x36



Now you can try a new Series of Lucifer Electric Heat Treating Furnaces absolutely free! For over a year the manufacturer of Lucifer Electric Heat Treating Furnaces has quietly been shipping Lucifer Furnaces of various sizes and types to a number of nationally known concerns on a strictly trial basis. The amazing thing is that we can furnish an affidavit to the effect that not one of these Lucifer Furnaces has been returned. Each one was bought and paid for at the regular advertised price. Now you too can try a Lucifer and see why they are rapidly coming to the fore as a leader in electric heat treating furnaces. Write for details of this amazing offer. One Lucifer Furnace can be used for regular hardening — case hardening — drawing — tempering, etc.

These new Series Lucifers incorporate new controls, so that the furnace may be brought up to the desired heat as slowly or rapidly as desired. Cooling time likewise may be controlled in the same manner.

Prices run from \$419.95 for the 6"x6"x12" to \$1290.75 for the 18"x18"x36".

*Write for free Literature. Dealers' Inquiries solicited.*

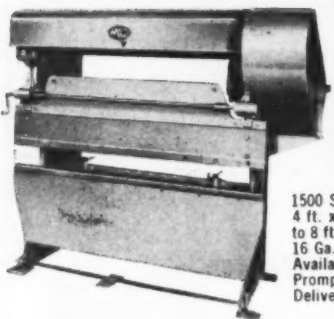
*New Series*  
**LUCIFER**  
ELECTRIC HEAT TREATING  
FURNACES

**GILBERT S. SIMONSKI**  
401 N. BROAD ST.

**SOLE MANUFACTURERS**  
PHILADELPHIA 8, PENNA.



## POWER PRESS BRAKE



1500 Series  
4 ft. x 10 Ga.  
to 8 ft. x  
16 Ga.  
Available for  
Prompt  
Delivery.

### Lowers Production Costs Through Greater Accuracy

The M/W Press Brake has been designed and engineered to provide greater and more permanent accuracy. There is no chance for human error in construction. The gibbing and all moving parts are machine located in an integral frame. Ram adjustment is through powerful alloy steel screws with opposite buttress threads to equalize thrust loads and lower maintenance costs. Right hand drive power transmission reduces torsional shafting deflection providing permanent accuracy. Anti-friction bearings reduce operating and maintenance costs.

*Write Today* for information on complete line of press brakes and forming dies. 36 standard sizes

Machinery Division

**AIRTHERM** Manufacturing Company

762 South Spring Ave. • St. Louis 10, Mo.

Serving the Metal Working Industry Since 1931

tool is next raised to the correct position and the boss **D** (figure 1.) is faced. The boring bar and tool is now placed in the head of the machine and the center hole is rough and finish bored. A facing tool is then placed in the bar and the pad **A** (figure 1) is machined to the dimension shown on the detail drawing.

The facing cutter is now removed from the boring bar which is taken out of the fixture. A bar with a counter-sinking tool is next placed in the bored hole and the end of the bored hole is countersunk for a depth of 1/16 of an inch.

To remove the finish machined work-piece it is necessary only to remove the nuts from the studs **H** and then take the block **J** from the studs. The piece can now be slid from the locating pin **K** and out of the V-surfaces on the block **G**.

This boring fixture is inexpensive to build, locates the workpiece positively, and also holds it securely. It is easy to operate, and as it is open in its construction, the operator can observe at all times his work and thus avoid mistakes. The fixture may well be considered an inexpensive, practical, and accurate production piece of manufacturing equipment. The End.

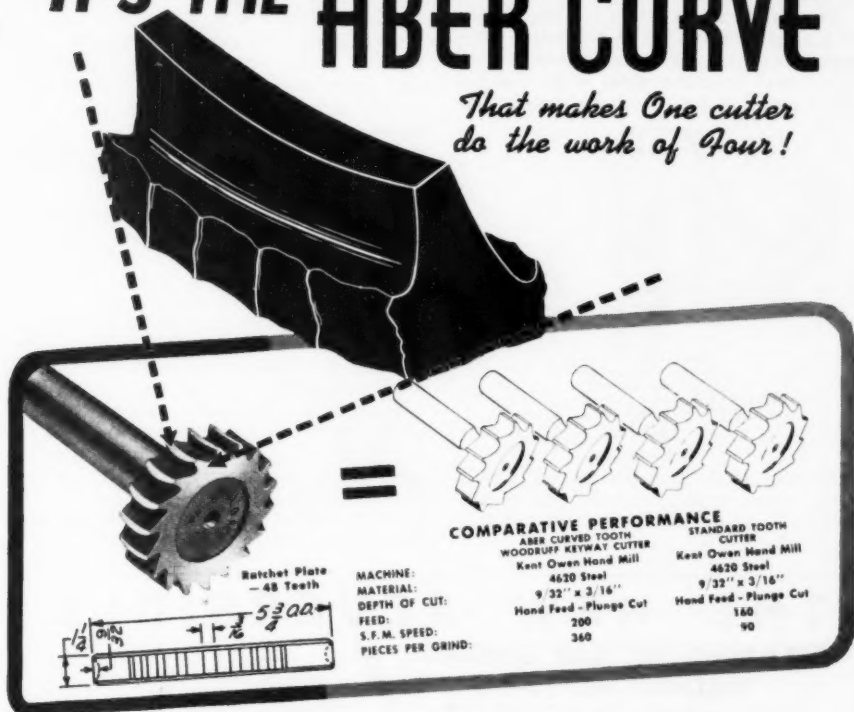
### Kink In Engine Lathe Operation

by George F. Burnley

When operating the engine lathe, there often arises the problem of estimating the exact position of the boring bar of threading tool inside of a hole of small diameter. While it is possible to get this position by marking positions on the lathe ways or by setting over the compound and boring according to the markings of a calibrated dial, such methods require taking the eyes off the job for a fraction of a second in which time a "ticklish" piece may be ruined. For such considerations, it is often wise to cut a long, thin strip of sheet metal roughly the size of a hack saw blade and insert it under the set screw of the tool holder. The other end should be bent over the piece being bored and snipped off at the exact position of the tool bit. This follows, outside, the path of the boring tool.

# IT'S THE ABER CURVE

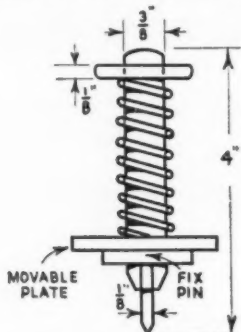
*That makes One cutter  
do the work of Four!*



### Automatic Punch

by Federico Strasser

The illustration gives a clear idea of a simple automatic punch made with scrap material. The body consists of  $\frac{3}{8}$ " round machine steel with inserted point made of tool steel, hardened. The



operation with this tool is extremely easy, necessitating only the use of one hand . . . no hammer, nor other auxiliary tool.

### Pointers on Buying Shafting and Bearings

by W. F. Schaphorst, M. E.

By driving lineshafts properly the cost of power and the cost of shafting can both be considerably reduced in many instances. It is accomplished by placing the driving motor or main driving pulley of the lineshaft in its correct place. The sketches herewith show how this is done.

The pulleys on lineshaft marked I are 10 ft. apart. Pulley A will transmit 10 h.p.; B, 15 h.p.; C, 30 h.p.; D, 5 h.p.; E, 10 h.p.; F, 20 h.p.; and G, 25 h.p., respectively, with a shaft speed of 200 rpm. The problem is to place the motor in the position that will require least weight of shafting and that will cause least power loss due to friction.

Sketch II shows the sizes of lineshafts required between the pulleys to transmit the quantities of horse power with the motor or driving pulley at the extreme left end. The minimum size of shaft is  $2\frac{1}{4}$ " at the right end and the maximum size is  $3\frac{1}{2}$ " at the left end,

## THE NEW REVERSIBLE

### EXCELSIOR CIRCULAR BENDING MACHINE No. 14-R

ROLLS PART OR COMPLETE CIRCLES

### PRODUCTION CIRCULAR BENDING

OF ANGLES, LEG IN OR OUT FLATS, PIPES, ROUNDS, SQUARES, TEES, CHANNELS

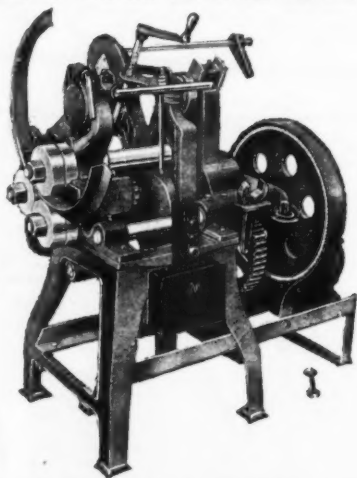
AND VARIOUS CROSS SECTIONS

FINGER-TIP

### PUSH BUTTON

CONTROLS FOR FORWARD, REVERSE AND INCHING MOVEMENT OF ROLLS OR STOP

EXCELSIOR TOOL & MACHINE COMPANY, EAST ST. LOUIS, ILLINOIS



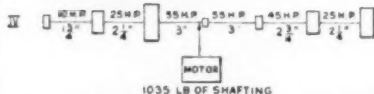
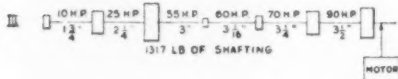
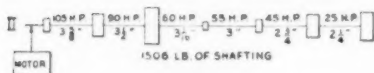
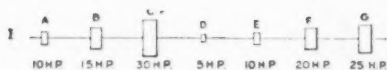
*The foreman's walking on air..*



Production up . . . costs down . . . and rejects rare as a February heatwave. No wonder the grinding foreman is uplifted. And here's the reason. He's using grinding wheels exactly suited to his jobs. They're Simonds Abrasive Company wheels . . . part of a complete line including grinding wheels, mounted wheels and points, segments and abrasive grains . . . all accurately specified, rigidly tested and scientifically produced under complete quality control by Simonds Abrasive Company, a major manufacturer of grinding wheels for over 50 years. Write for free data book.

SIMONDS ABRASIVE COMPANY, PHILADELPHIA 37, PA. DISTRIBUTORS IN PRINCIPAL CITIES

Division of Simonds Saw and Steel Co., Fitchburg, Mass. Other Simonds Companies: Simonds Steel Mills, Lockport, N. Y., Simonds Canada Saw Co., Ltd., Montreal, Que. and Simonds Canada Abrasive Co., Ltd., Arvida, Que.



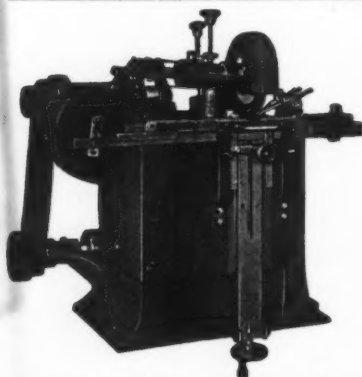
because all power must go through that end.

Next is sketch III which shows the sizes of shafting required with the drive at the extreme right end. This time the minimum size of shaft is  $1\frac{3}{4}$ " and the maximum size  $3\frac{1}{2}$ ".

And finally, sketch IV shows how to determine the correct position: Work inward from both ends of sketches II and III and place the motor on the "maximum" size of shaft. The maximum size here is 3".

Computing the weights of II, III, and IV, it will be found that with 10 ft., between each pulley, 1506 lbs., of line-shafting will be required for line II, 1317 lbs., for line III, and 1035 lbs., for line IV. In other words, line II requires 45% more than line IV and line III requires 27% more than line IV.

Obviously, line IV will absorb least friction because the smaller the shaft the less the surface speed, and consequently the less the power loss. That is an important advantage. Another important advantage is that the bearings for the smaller lineshaft sizes will cost less, which is particularly true where it is decided to use anti-friction bearings as is so common these days. In other words, an arrangement such as this, gives us the most economical lineshaft to buy as well as to operate.



**Wardwell Model EC Combination Grinder.** The only single unit grinder adaptable for hack, band and circular saws that does not depend on the shape of the grinding wheel to form the shape of the tooth. This unique feature enables operator to grind a variety of blades without dressing or changing wheels.

## HACK SAW BLADES last 6 times longer

Instead of discarding hack saw blades put them back in use by sharpening them. Not one or two sharpenings but as many as 6 sharpenings are possible when the EC is used.

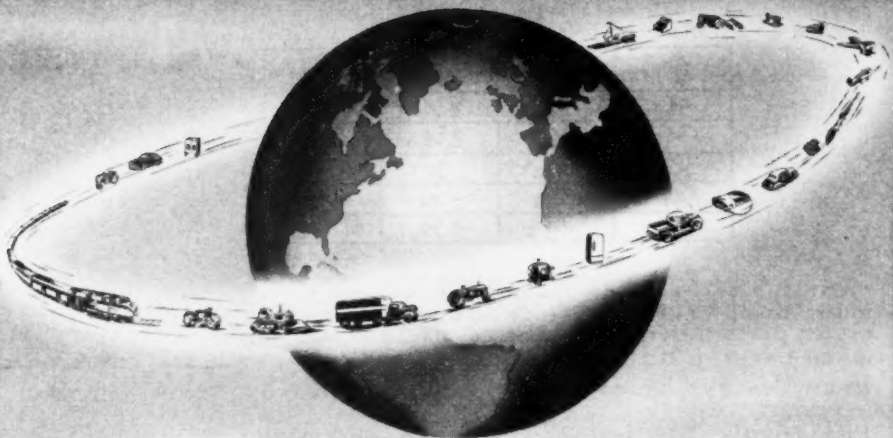
This machine actually pays for itself in the savings on blades alone. But more important is the exceptionally fine cutting edge it gives to old blades, actually much better than new. Blades are keener and longer lasting. Wardwell EC wheel will not burn, anneal or injure hardness of teeth. Sharpens circular, hack or band saws on one machine

**Write for Bulletin EC today.**

**THE WARDWELL**

**MANUFACTURING CO.**  
3165 Fulton Rd. - Cleveland 9, Ohio





## NATCO MARKS A HALF CENTURY OF CONTRIBUTION TO INDUSTRIAL ADVANCEMENT

If you could look on the inside of thousands of manufacturing plants throughout the world, you would see NATCO machines busy drilling, facing, boring and tapping billions of large and small holes in parts destined for everything from automobiles, trucks and tramp steamers to radios, electric motors and home appliances.

All these things are a part of tremendous scientific industrial advancement made possible through the combined effort of machine tool builders and American Industry. With the turn of the half century into the atomic age of the present, every man and woman in the NATCO organization is proud of his part in this fifty-year record and glad to look ahead to the opportunity of serving industry and the forces of freedom in the years to come.

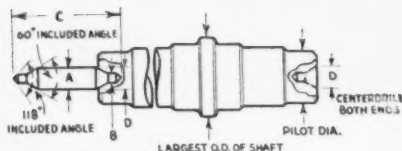
NATIONAL AUTOMATIC TOOL COMPANY, INC., Richmond, Ind., U. S. A.



## How to Select Centerdrill

by George Pheil

To determine how large or small a centerdrill diameter to use with a certain size shaft is a problem presented to the machinist. Unless a systematic method of selection has been charted



DIA. OF BODY	DIA. OF DRILL	LENGTH OF CENTERDRILL	DIA. IN SHAFT
3/10	1/8	2 1/8	1/4
7/16	3/16	2 3/4	13/32
1/2	1/32	3	7/16
5/8	1/32	3 1/4	1/2
5/8	7/32	3 1/4	9/16

PILOT DIA'S 5/8" UP TO 1" USE 1/4 DIA. CENTERS  
 PILOT DIA'S THAT ARE 1" USE 13/32 DIA. CENTERS  
 PILOT DIA'S OVER 1" USE 7/16 DIA. CENTERS  
 WHEN LARGEST O.D. OF SHAFT IS 3" TO 3 1/4 DIA. USE 1/2 DIA. CENTER  
 WHEN LARGEST O.D. OF SHAFT IS 3 1/4 AND OVER USE 9/16 DIA. CENTER

from practical shop experience, the operator may haphazardly range to and fro in his choice. Even queries from the foreman may bring various different decisions.

Here is a solution that is practical to this everyday shop problem and found to be satisfactory. It should be mounted over the centerdrill machine for easy access and reference by the operator. It is also valuable to the engineering draftsman who usually omits this centerdrilling operation from the drawing and is thus overlooked in determining cost.

Individual machine shops may enlarge upon the table listed to suit their

individual requirements, but the sizes listed include a wide segment of the uses of the average machine shop and will prove adequate.




**T-BOLTS**  
HEAT TREATED

**HIGH TENSILE STRENGTH**

1/2 x 2"	.....\$ .44 ea.
1/2 x 3"	.....".50 "
5/8 x 2"	.....".51 "
5/8 x 3"	.....".57 "
3/4 x 2"	.....".66 "
3/4 x 3"	.....".77 "
1 x 4"	.....1.54 "

Complete Range — 10 1/2" other dia. to 12". Write for complete price list and quantity discounts.

**IMMEDIATE DELIVERY—**  
F.O.B. DET.

**WEST POINT MFG. CO.**  
Farmington, Mich.

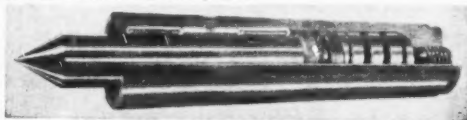
19625 Merriman Ct.

## IT PAYS TO USE "NIROL" LIVE CENTERS — HERE'S WHY:

It's a rugged, simplified designed precision live center permitting perfect support of all loads and thrusts. Reduced overhang adds rigidity and increases machine capacity. Compensating factor provided for work expansion from heat while machining. Has met with hearty approval of machinists and shop men.

Morse Taper Sizes:  
 No. 2 .....\$21.75  
 No. 3 .....26.75  
 No. 4 .....32.50  
 No. 5 .....49.75

Other sizes and prices upon request



**Increases  
Production**  
  
**SAVES TIME**  
  
**SAVES MONEY**

Patent Applied for

**L. F. TREICHLER — PRECISION GRINDING**

900 ROUTE 29

NORTH PLAINFIELD, N. J.

# SPEEDY AIR VISE

**SPEEDS UP**

✓ MILLING

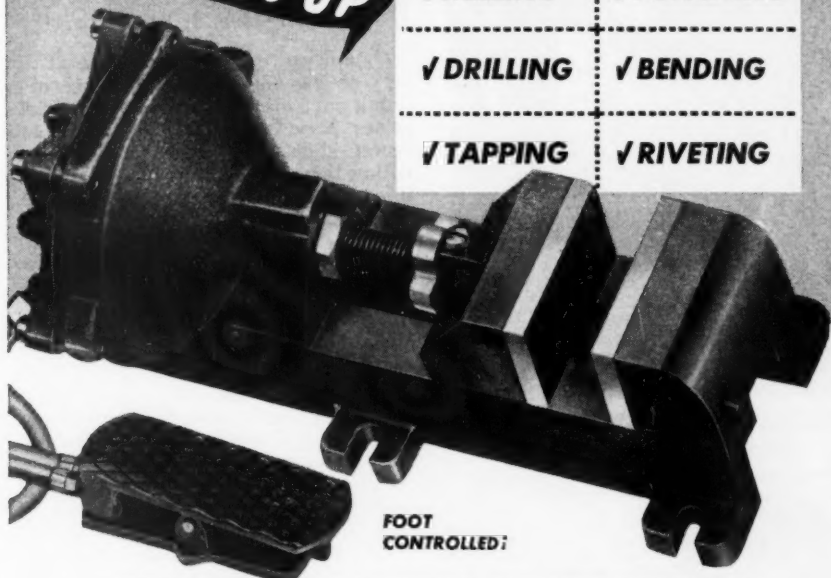
✓ PUNCHING

✓ DRILLING

✓ BENDING

✓ TAPPING

✓ RIVETING



**FOOT  
CONTROLLED**

## GRIPPING FORCE 15 TIMES AIR LINE PRESSURE

Speedy Air Vise helps you do dozens of operations faster, better, cheaper—by air pressure! Foot control valve opens and shuts vise instantly, leaving *both* hands free to produce *more*! Jaw opens up to 3 inches, holds castings, parts, jigs, etc. Compact, trouble-free, inexpensive.

Complete with Foot Control Valve, Air Hose and Fittings . . . only **\$29.90**

ORDER FROM YOUR MILL SUPPLY DEALER OR WRITE DIRECT



### AIR REGULATOR

Precision-built. Delivers pressures up to 140 lbs. With gauge, \$4.95  
Less gauge, \$2.95



### AIR FILTER

Keeps water and particles out of the regulator and pneumatic tools. \$2.45

### BLOW-GUN

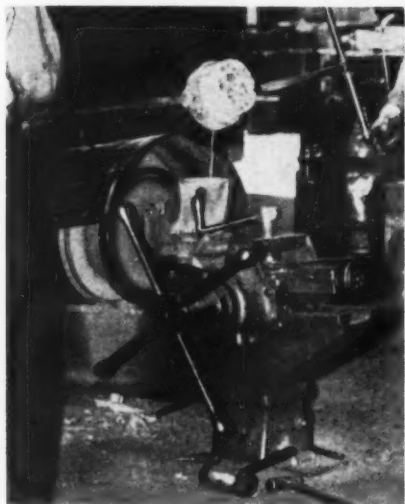
Looks and operates like a gun. Ideal for cleaning and blowing out chips, dust, filings, scraps, etc. . . . \$3.00



**W. R. BROWN CORP. • 5724 ARMITAGE AVE. • CHICAGO 39, ILL.**

## Turret Lathe Becomes Casting Machine

Too old to compete successfully with



it more modern counterpart in metal turning, this thirty-one-year-old cone-drive Warner & Swasey turret lathe nevertheless is far from the scrap pile.

Converted to a centrifugal casting machine in the Federal-Mogul plant in San Francisco, it is used for the production of large solid bronze bearings and for lining steel or bronze bearings.

Cylindrical molds like the one at the left, or the bearing itself in case of a lining job, are held between flat face plates fixed to the spindle nose and turret slide. The latter plate has a hollow bearing which connects with a filler spout mounted on the slide.

When the machine has been brought up to speed, molten metal is poured into a filler spout, whence it enters the cavity between the face plates and is thrown against the mold by centrifugal force.

The machine base was removed to provide a convenient pouring height, and other non-essential parts were removed; part of the bedways were chipped away to permit swinging large-diameter molds.

The veteran turret lathe was converted to mold spinning in 1945, and has served continuously in that capacity ever since, operating in regular production alongside newer machines designed specifically for centrifugal casting.

### Accurate Hole Transfer Made Easy With NIELSEN TRANSFER SCREWS

Simply insert in holes, invert, strike sharply and you have centers and drill circles perfectly located. Reduce time and eliminate spoilage of other methods. 8 sizes, from  $\frac{1}{8}$ " to  $\frac{1}{4}$ " U.S.S. Inexpensive — Last for years.



Write for Circular  
**NIELSEN TOOL &  
DIE COMPANY**  
1962 W. Eleven Mile Rd.  
Berkley, Mich.

## INSTANT ACTION RAPIDSET by HARTMANN

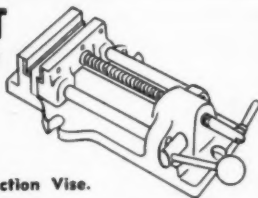
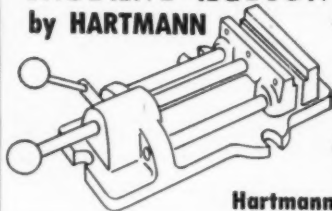
All Purpose Tool Room and  
Machine Shop Vises.

### The JAWSET

Adjustable Pressure Production Vise.

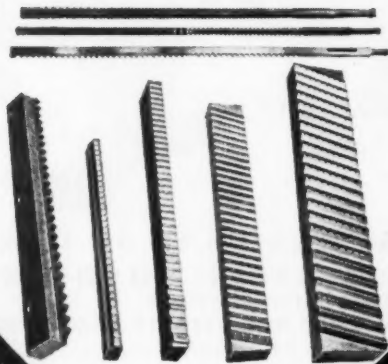
For Information Write Dept. M

Hartmann Mfg. Co., 1637 Gould St., Racine, Wisconsin

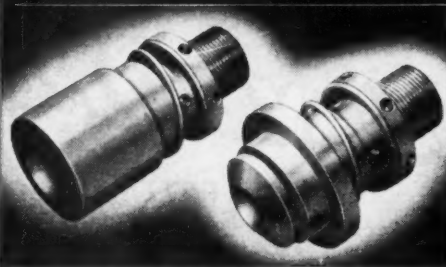


# American BROACHES

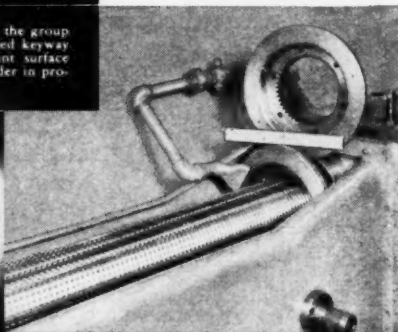
LAST LONGER ★ IMPROVE FINISH ★  
REDUCE RESHARPENING



Shown above are a variety of American broaches. Included in the group are a round spline broach, a combination internal and inverted keyway broach, and a keyway broach. Also five sections of different surface broaches. In use, these sections are mounted in a broach holder in progressive stages to form a complete unit.



American offers a complete line of push and pull heads to help you get maximum value from your broaches. All types are available, correctly designed for round, flat, keyway, spline, and odd-shaped broaches. A free catalog gives complete data on American push and pull heads. Write for your copy today. Ask for Circular 7000-B.



More than 35,000 gears have been broached to date on this American broach, and the broach still has a life expectancy of 35,000 more. The secret of obtaining high production from a well-made broach is proper sharpening at regular intervals. For best results, follow the manufacturer's instructions implicitly; improper sharpening can ruin a good broach. Send for American's free catalog on broaches. Just ask for Circular



## American BROACH & MACHINE CO.

A DIVISION OF SUNSTRAND MACHINE TOOL CO.

ANN ARBOR, MICHIGAN

See American First—for the Best in Broaching Tools, Broaching Machines, Special Machinery

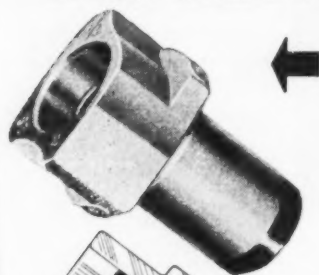




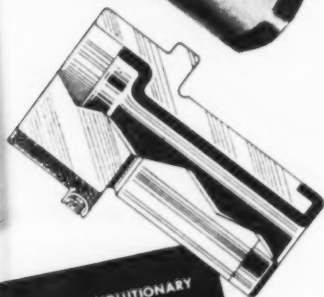
## **Revere BUSHINGS WEAR 6 TO 30 TIMES LONGER THAN ALL STEEL BUSHINGS**

(FIELD TEST REPORTS PROVE THIS STATEMENT)

**WE ONLY CLAIMED 3 TO 4 TIMES THE LIFE OF TOOL STEEL**



Revere Revolutionary Drill Bushings have all the accuracy of solid type bushings. Made of Super Pressed High Chrome, High Carbon Steel, Revere bushings last longer, wear better, and are assembled from complete stocks near you.



REVERE REVOLUTIONARY  
DRILL BUSHINGS HAVE A  
WEARING SURFACE  
MCM-HC .030 TO .050  
THICK ASSEMBLED IN A  
DIE CAST BODY.



# **SAVE ON**

**FIRST COST  
CHANGE TIME  
INVENTORY  
MACHINE DOWN TIME**

The Revere Drill Bushing comes to you as the result of 30 years of continuous bushing experience. This experience, plus our new Revolutionary method of making drill bushings means lower cost and higher quality.

**Revere Fisher ENGINEERING CO.**  
NORTH BRANCH, MICHIGAN



WHEN  
THE

"SPECS"

CALL FOR  
HARDNESS  
TESTS...

**Here's what you need!**

**"ROCKWELL" Hardness Tester**

If you suddenly find yourself with a set of specifications calling for hardness tests, the requirement can most likely be taken care of simply by a ROCKWELL Hardness Tester. This machine, developed and made only by Wilson, is a standard in hardness testing. For laboratory, toolroom, or production line. Made in hand-operated or motorized models. Vertical capacities from  $3\frac{1}{4}$ " to 16".

**"ROCKWELL" *Superficial* Hardness Tester**

When the material is thin, nitrided or lightly carburized steel, or the areas too small for the regular ROCKWELL, here's the machine to use. Its indentation is .005" or less.

**TUKON**

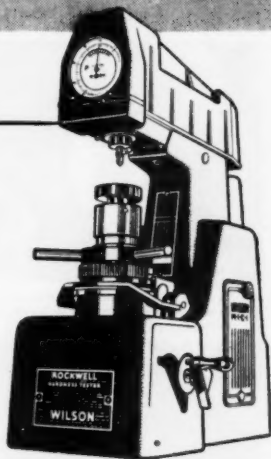
Microscopic, mechanically or electrically controlled, TUKON Microhardness Tester provides a completely automatic testing cycle. Can be used on delicate precision parts. May be used with Knoop or  $136^\circ$  diamond pyramid indenter. Three models for full range of testing.

**WILSON** MECHANICAL INSTRUMENT CO., INC.

AN ASSOCIATE COMPANY OF AMERICAN CHAIN & CABLE COMPANY, INC.

230-T PARK AVENUE, NEW YORK 17, N. Y.

Write today for literature



**ACCESSORIES**

**"Brale"**—The only diamond penetrator made to Wilson's standards.

**Test Blocks**—for checking accuracy of your instruments.

**Equitron**—for correctly positioning test samples for hardenability tests.

**Gooseneck Adapter**—for the testing of inner cylindrical surfaces.

**Work Supports**—for holding rods, tubes, or irregular shapes.

**ACCO**

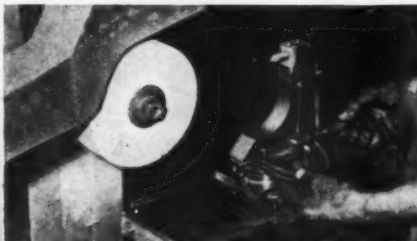


# HOW A J & S "Fluidmotion" WHEEL DRESSER *cut production costs* FOR THE ADAMAS CARBIDE CORPORATION

Paul C. Boniti, Shaping and Forming Supervisor of the Adamas Carbide Corporation, Harrison, N. J., reports that his standard Model "E" J & S "Fluidmotion" Wheel Dresser has



**1** To set-up for convex radius, first mike distance from diamond point to micrometer plate, then add radius desired. (For concave radius, subtract).



**2** Slide dresser in dust-proof channel till mike slips over pins as shown and lock with socket wrench. Dresser is now ready for action.



**3** Bring diamond point up to center line of wheel, rotate dresser on swivel base in one continuous motion. A clean, accurate radius results! No chatter marks.

OTHER "Machine Shop TIME SAVERS" by J & S  
J & S "All-Purpose" Jaw Clamps, KOALA Circular Cutting Tool,  
"Down-Hold" Vise Jaws, and "Attachable" Parallels. Write for  
"Time Savers" Booklet.

- Cut set-up time
- Cut dressing time  
(save on diamond and wheels)
- Cut maintenance cost

In 4½ years grinding presintered carbide has cost  
\$17.50 to maintain — less than \$4.00 per year.

HOW "Fluidmotion" saves time is demonstrated at left. Photos taken at Adamas Carbide show how a concave or convex radius—accurate to .0001" can be obtained in three simple steps.

Dressing two angles tangent to a radius is simple. Only one more step is necessary. After radius is set (steps 1 and 2) the dresser is swung on its graduated base to first one angle, then the other, and both are locked in with a turn of the knurled knob. Actual dressing is again accomplished in one continuous motion—it is not necessary to move the dresser on dove tails to form the angles.

It is important in our work to have a rigid dresser that can dress a wheel true consistently, leave no chatter marks, and still not have the abrasive content in the presintered material affect the accuracy of the dresser. This I can personally vouch for. J & S "Fluidmotion" in 4½ years has passed this test. I have complete confidence in "Fluidmotion"—no trial and error in order to obtain accurate forms. Our company has enjoyed the lower production cost made possible by "Fluidmotion's" repeated accuracy and ruggedness. It's a cinch to do our grinding jobs.

Adamas Carbide, well known for its high quality, low cost carbide blanks, attributes a fair share of its success in attaining more efficient production to its J & S "Fluidmotion" Wheel Dresser.

You, too, can also cut production costs by employing the J & S "Fluidmotion" Dresser in your tool room.

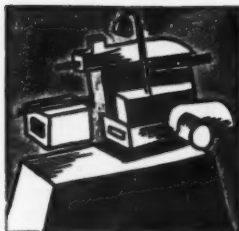
Application to any surface or cylindrical grinder is quick, simple. Set-up and dressing time is yet the lowest to be found.

Wheel Dressers made to dress wheels accurately up to 36" in diameter, and designed to meet your grinding requirements.

\*Reg. U. S. Pat. Off.

For details, write to:

**J & S TOOL CO., INC.**  
471 Main Street, East Orange, N. J.  
Representatives in Principal Cities



## Modern Tools in Action

### Precision Turning Cuts Costs

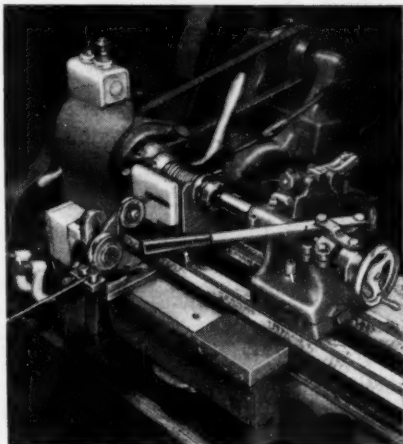
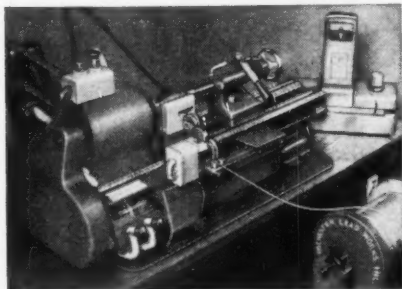
Using a small precision bench lathe the F. J. Kester Company, Edwardsburg, Mich., has solved the problem of economically producing aircraft carburetor parts to exacting specifications.

One of the parts was a control link made from 24ST4 rectangular aluminum bar stock  $\frac{1}{2}$ " x  $9/16$ " x  $4\frac{3}{4}$ ". The center had to be reduced to  $5/16$ " diameter, with a surface smoothness of 100 microinches rms or better. Usual procedure would have been to first machine the part in a lathe, then finish by grinding to obtain the required surface smoothness. It was obvious that a considerable saving could be made if the grinding operation could be eliminated.

A 9" swing South Bend Precision Bench Lathe was tooled up for the job. Longitudinal feed stops were used to locate both ends of the cut. A cross-feed stop was used to position the cutting tool for the diameter. Two high speed steel combination forming and turning tools mounted in a square turret tool block performed all forming,

rough turning, and finish turning operations. The work piece is driven by a 4-jaw independent chuck and supported in the tailstock by a special revolving center. A simple adapter in the 4-jaw chuck permits inserting and removing the work by opening only one chuck jaw, so no re-centering is required.

With a little experimentation, the correct spindle speeds and feeds were established, and the most satisfactory clearance and rake angles for the cutting tools determined. The results were surprising. The specified surface smoothness of 100 microinches rms is now being maintained on a production basis, taking one roughing and one finishing cut over the center section of the piece.



## Waste Heat Recovery Leads to Large Savings

The recovery of waste-heat from air compressors and their driving engines at the plant of Schramm, Inc., West Chester, Pa. is resulting in definite savings. The recovered heat supplies Btu's for which coal, oil or gas would have to be burned with any standard heating system.

In the Schramm plant, three 315 cubic feet per minute compressors, two driven by diesels and the third by a spark-ignition engine using manufactured gas fuel, deliver about 400,000 Btu's per hour into a system suitable for space or process heating.

In a report recently published by J. L. Michener, plant engineer, a system for recovering lost heat is explained. The solution lies in making arrangements for heat recovery, so that cost of heat-recovery equipment doesn't consume the fuel savings that result.

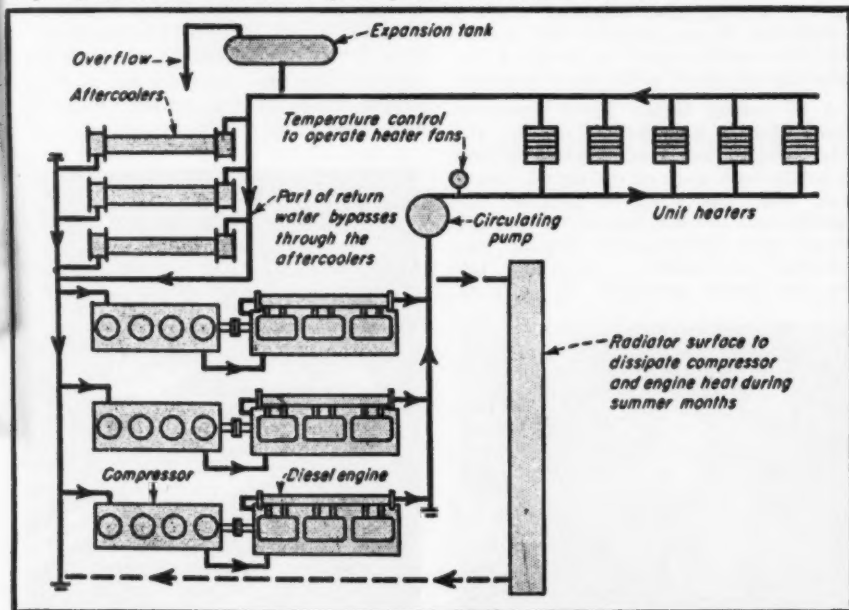
In the Schramm plant, the engine compressors are teamed with unit heaters. The engines are equipped with marine-type water-cooled manifolds. Water coming off the engine jackets thus picks up Btu's that would otherwise be exhausted to the atmosphere and wasted. Water is taken directly from discharge of the engine-compressor cooling system and circulated by the engine pump through the heating equipment.

Certain controls are necessary. There should be a control in the hook-up to keep unit-heater fans from operating until water reaches a pre-set minimum temperature. This prevents blowing cold air.

For heat dissipation in the summer months, the water can be circulated just as before, but the unit heater fans are reversed to discharge outside the building.

In a case such as this one, the cost of equipment and piping necessary to

Heat-recovery hookup shows the water flow through after coolers, compressor packets, engine jackets and manifolds, to pick up BTU for circulation to heaters.

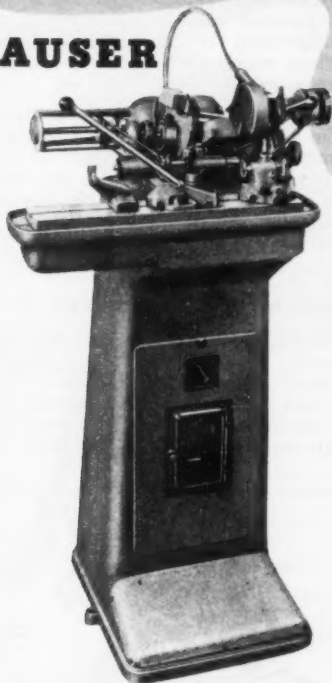


# PRESENTING IN

• WISCONSIN • ILLINOIS •  
• MINNESOTA • IOWA •

## THE LATEST IN HIGH PRECISION LOW-COST PIVOT POLISHING

### HAUSER



Faster and more accurate than any other grinding or polishing method known.

#### PIVOT POLISHING MACHINE FOR WET POLISHING

Minimum diameter to be polished.....	0.008"
Maximum diameter to be polished.....	0.197"
Maximum length to be polished.....	0.315"
Maximum length of workpiece.....	5"

Burnishing machines available to polish as small as 0.002" as large as 1"

These machines include semi-automatics and a duplex polishing machine with automatic release.

Burnishing is done by special long-life carbide or ceramic wheel.

Burnishing will replace, in many instances, centerless grinding.

Burnishing surfaces, means thinnest lubrication film and minimum of clearance. Burnishing can be done by unskilled labor. Will polish pivots straight, taper or radius. Will polish shoulder at the same time as the cylinder at right angle or bevel, as desired.

Will polish mild steel, hardened steel, brass, nickel, bronze, etc.

Will do 600 or more pivots per hour.

Takes work in collet or on centers.

A fine machine tool made with unerring care. On display in our showroom.

Literature Available on Request

### REPRESENTED BY RUSSELL T. GILMAN

JIG BORERS • JIG GRINDERS • OPTICAL COMPARATORS • MICROSCOPE  
TOOLMAKERS LATHES • SWISS AUTOMATICS • GEAR HOBBS  
BURNISHING MACHINES • PINION CUTTERS



### RUSSELL T. GILMAN

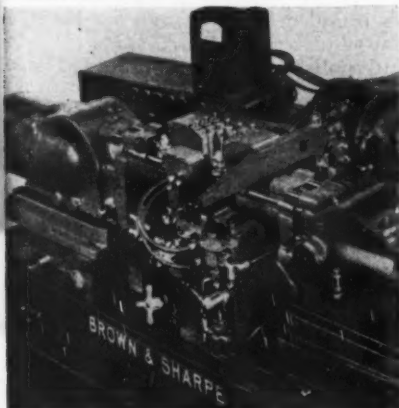
525 EAST MICHIGAN STREET  
MILWAUKEE 2, WISCONSIN  
TELEPHONE BROADWAY 6-1470

recover heat and put it to work is relatively small and the scheme results in real dollar savings. The heat recovered is 1250 Btu's per hour per cubic foot per minute of compressor capacity at 100 pounds per square inch.

### **Electronic Equipment Speeds Machining of Blades for Jet Engines**

The manufacture of aircraft jet engine blades entails the accurate machining of the holding surfaces with respect to the airfoil surfaces. The Brown & Sharpe Mfg. Co. has developed and constructed an ingenious machine for positioning the blade and drilling center holes used for location purposes in a subsequent machining operation on the holding surfaces.

The blade is supported in a non-frictional reed-mounted cradle arranged to adjustably pivot about two axes and is adjustable vertically. Either of the three movements can be clamped independently without affecting the other movements. Proper positioning is effected by observation of six strain gage indicator points in contact with the airfoil surface and adjusting the three movements to the "zero" position. Indication is obtained from a Brown & Sharpe Electronic Amplifier.



A multiple position switch permits selection of individual gage indication for set-up purposes. Additional switch positions cause all gages to be inter-

connected electrically to show individual average indications for the three movements required to bring the airfoil surface to its proper position. In this way the airfoil surface is best positioned to be least affected by errors of twist or bend in the blades.

After positioning the blade a switch is operated causing advance of three combination center drill and facing cutters which make three operations on bosses on the blade.

The machine set-up is accomplished from a master blade. The machine accommodates seventeen sizes of blades; it is estimated that a man can operate the machine at a rate of 100 blades per hour.

### **Screw Machine Attachments**

If and when a screw machine can readily be tooled to do a given job, without using either an attachment or a second operation, it is naturally better to handle the work in that way. Where that cannot be done, and the choice



"I've wanted to run one of these things ever since I became president."



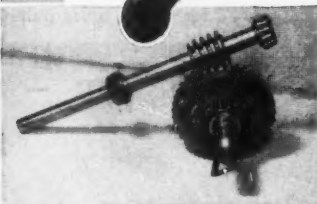
# 4 TIMKEN BEARINGS!

## Kalamazoo



KALAMAZOO  
MODELS —  
816-S — 824-S  
(COOLANT  
EQUIPMENT  
AVAILABLE)

## METAL CUTTING BAND SAW



Fast cutting, accurate, ruggedly built, the Kalamazoo Metal Cutting Band Saw is substantially reducing metal cutting costs in plants and shops from coast to coast!

Typical of the sound engineering behind the smooth-cutting efficiency of the Kalamazoo is the worm gear drive unit. *Only* Kalamazoo offers an all-Timken bearing unit!

Bars, angles, tubes, pipe — the Kalamazoo cuts them all, quickly and easily, with no burr, minimum kerf. Blades can be changed in 30 seconds. Operator gets a clear, direct view of the progress of any cut. Handles 95% of cutting jobs. Easily moved by one man.

Write today for full details on the Kalamazoo — today's outstanding value in metal cutting band saws!

MACHINE TOOL DIV. *Kalamazoo* TANK and SILO CO.

221 HARRISON STREET

KALAMAZOO 16, MICHIGAN

lies between the use of a screw machine attachment and a second operation, it will in nearly every case pay to do the added work by means of the attachment, if an attachment can be made to serve.

We are thinking of single spindle screw machines, as they are found in so many places producing small-diameter work. In this connection, there come pieces to be handled which really have so much forming and other radial-approach work to be performed, that it is difficult or impossible to get it all in. In such cases, a vertical slide attachment can often be applied, which is employed to carry the cutoff tool. Thus, greater capacity in the particular respect needed is obtained.

In the ordinary screw machine setup, drilling can only be axial to the work, and performed from the turret. This limitation has left cross drilling and index drilling, where either necessarily had to be performed, as a second op-

eration. However, it is noteworthy that attachments are available for these purposes. There is a cross drilling attachment, and there is an index drilling attachment. A separate drive source is required to rotate the drill in these cases, and special attachment driving stands have been provided by the screw machine manufacturer for this purpose.

In connection with drilling, it may be well to point out that there is a combination drilling and tapping attachment in use in some places. Also, there is a special nut tapping attachment, that is utilized in many places, where nuts are produced in quantity by the screw machine method. Screw slotting attachments are also in use in a considerable number of places, in connection with the automatic screw machine. These attachments have a transfer arm, that takes the piece as it is cut off, and carries it to the slotting station.

### Plastic Pulley Cuts Machining Costs

Use of plastic pulleys, molded from macerated, fabric-base Synthane, has reduced by two-thirds the cost of pulleys in the manufacture of precision drilling machines at the High Speed Hammer Company, Inc., Rochester, N.Y. Most of the saving reflects a reduction in machining costs. Only two machining operations, in the manufacturer's plant, now produce a finished pulley; the cast aluminum pulleys formerly used required seven.

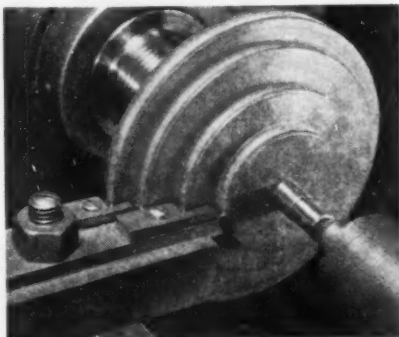
The manufacturer attributes these savings partly to the ease with which the plastic may be machined, and partly to the form in which the pulley blanks are furnished by Synthane Corporation of Oaks, Pa.

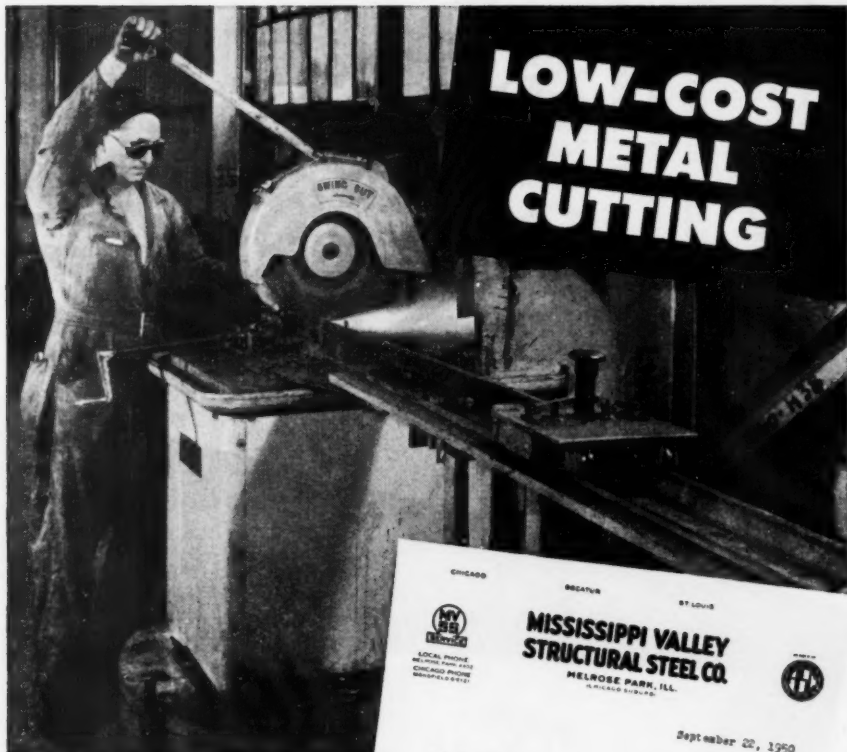
The drill press manufacturer designed an ingenious tool with four cutting edges, all permanently secured to cut four pulley grooves simultaneously and with a single setting. This tool produces grooves with diameters of  $1\frac{1}{8}$ ,  $2\frac{3}{4}$ ,  $4\text{-}3/16$  and  $5\text{-}7/16$  inches on the spindle pulley, and  $2\frac{3}{8}$ ,  $3\text{-}23/32$ ,  $5\text{-}3/32$  and 6 inches on the motor pulley. Before the

pulleys are shipped to the Rochester firm, the hubs are drilled and tapped to take  $1/4$ " set screws and the blanks are lathe-finished all over. Molded spindle holes of  $1/2$ " diameter are reamed by the Rochester manufacturer to a tolerance of plus .0005" and minus .0000 in.

• • •

An ingenious method of machining four grooves simultaneously in this plastic blank, which will be used for a drill press pulley.





# LOW-COST METAL CUTTING

(Photo Courtesy Mississippi Valley Structural Steel Co.)

This progressive fabricator now has six Stone metal cut-off machines in operation.

The Stone Swing-Cut in your shop will cut metals at the rate of 4 seconds per square inch at a cost of approximately  $1\frac{1}{3}$  cents per square inch. You can lower your metal-cutting costs—in ferrous or non-ferrous materials—with a Stone Swing-Cut. Write today for further information.

CHICAGO  
ST. LOUIS  
ATLANTA  
MEMPHIS  
NEW YORK  
PHILADELPHIA  
PITTSBURGH  
RICHMOND  
ST. PAUL  
WASHINGTON, D.C.  
WHEELING

**MISSISSIPPI VALLEY  
STRUCTURAL STEEL CO.**  
MELROSE PARK, ILL.  
INCORPORATED IN ILL.



September 22, 1950

Mr. H. A. Kacerer  
Stone Machine Company  
Syracuse, New York

Dear Mr. Kacerer:

We are pleased to report to you that since the purchase of your M16 swing abrasive cut off machine in January of this year, we have had remarkable results in both production and costs.

We have been producing considerable quantities of structural steel railing for industrial plants and have found that the cutting time required to accurately cut off this pipe for our assembly department has been improved five times over our previous methods. Our records show that this machine paid for itself in the first six months of operation.

We feel that we have indeed found a valuable tool for production in this machine and thank you for your cooperation in assisting us in fulfilling our needs.

Yours very truly,

*W. A. Stuckey*  
W. A. Stuckey  
Shop Superintendent

KAS:ev

**STONE MACHINERY CO., INC.**

304 FAYETTE ST. MANLIUS, NEW YORK

*Get your copy...*

**WRITE  
FOR IT  
TODAY!**

# WAREHOUSE STOCKS



Allegheny Ludlum  
Tool and High Speed Steels

ALCOA CORPORATION - PITTSBURGH 23, PENN.  
ALCOA CORPORATION - PITTSBURGH, N.Y.

# Here's a TOOL STEEL STOCK LIST that's really *Clear, Concise and Dependable!*

## There's an A-L Tool Steel to do each job best

The Allegheny Ludlum Tool Steel family includes 37 principal types, covering the high speed, hot work, shock resisting, cold die, and carbon and low alloy steel fields. Let us help you find the best answer to *any* problem that occurs in your production or use of cutting and forming tools.

ADDRESS DEPT. MB-13

This 72-page catalog lists the stocks of A-L High Speed and Tool Steels which are constantly maintained in each of 18 warehouses, located at convenient points from coast to coast. In compact, easy-to-follow style, the book gives a complete stock picture, nationwide, of the 15 most widely used types of these steels—each in a full range of standard shapes and sizes—and also includes data on stocks of drill rod, tool bits and Carbet carbide metal blanks and tools.

It may be that your requirements call for *lift* shipments. If so, you can rely on us to schedule material for you without delay. *But*—if you depend entirely or in part upon ordering High Speed and Tool Steels in smaller lots—and want to know where you can get them *quickly*—you'll find A-L's

book of "Warehouse Stocks" mighty handy to have in your desk. • Write for your copy *today!*

# ALLEGHENY LUDLUM

STEEL CORPORATION  
Pittsburgh, Pa.

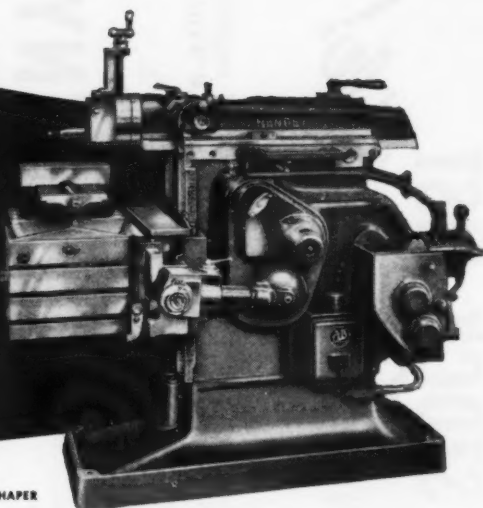
TOOL STEEL DIVISION: DUNKIRK, N. Y.

*Fine Tool Steels*  
*Since 1854*

AL

WED 3133

...If you are not  
using Modern  
Hendey Machines  
you are not  
earning the  
profits that  
you should!

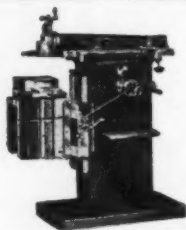


**1950**

12" UNIVERSAL CRANK SHAPER

A comparison of the old Hendey Friction Shaper with the NEW Hendey 12" Universal Crank Shaper will instantly reveal the profit possibilities that you may be missing. The modern Hendey Shaper offers the most complete, up-to-date shaper available today. Full standard equipment means that there are no "extras" to buy. This equipment includes table and vise for positioning and indexing work to any angle—

flanged mounted motor—mechanical controls on both sides—fully automatic lubrication—quick change swivel head—adjustable, preloaded Timken bearings on the bull gear. The 12" Hendey covers a range which makes it ideal for tool room and production work. Hendey Shapers are also available with capacities from 16" to 28", both standard and heavy duty. Write for full details on the modern Hendey Shapers.



1920

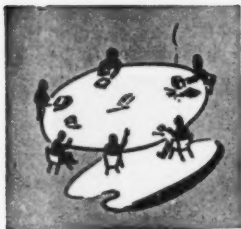
Still using old 15" Hendey friction drive shapers? They have only 2 speeds, 21 and 30 1/2 strokes per min., as against 8 speeds from 14–200 for the new 12" shaper. Surveys prove that the new 12" Universal High Speed Crank Shaper covers a majority of all jobs in most plants. Mechanical changes are almost too numerous to mention—improved accuracy, speed and profits on the new 12" shaper will easily convince you of the advisability of changing now!

Continuous, advanced engineering by Hendey is worth watching—and must be watched if you are to earn full profits from your lathes and shapers. For complete particulars and prices, contact your nearest Hendey office.

**MODERN**  
*Hendey*

THE HENDEY MACHINE COMPANY  
MAIN OFFICE & PLANT TORRINGTON, CONN.  
BRANCH OFFICES: New York, Chicago, Boston, Detroit,  
Rochester, Los Angeles, San Francisco  
REPRESENTATIVES: Philadelphia, Cleveland, Pittsburgh



**MTBB**

FEBRUARY, 1951

## *News of the Industry*

### **AMERICAN ENGINEERS, INVENTORS HONORED BY A.S.M.E.**

Distinguished American engineers, scientists and inventors were honored recently at the 1950 annual meeting of The American Society of Mechanical Engineers, held at the Statler Hotel, New York, Nov. 29, 1950.

The highest award of the society, the ASME Medal, was presented to Harvey C. Knowles, vice president of the Proctor and Gamble Defense Corp., Cincinnati. The medal, conferred annually for distinguished service in engineering and science, was awarded to Mr. Knowles for contributions to the process industries and to the loading of ammunition. The award carried the citation:

"Engineer, industrialist, civic leader and patriot, responsible in peace time for outstanding engineering advancement in the process industries and in war time, for the successful application of continuous production processes to the loading of explosive ammunition with resultant great reduction in time and costs."

Mr. Knowles is vice president and national director of the Army Ordnance Association, and chairman of the rocket, bomb and artillery ammunition division. He is also chairman of High Explosive Loading Advisory Committee, Safety and Security Branch of the War Department.

The Holley Medal for inventions of great public benefit, was awarded to Charles G. Curtis, president of the International Curtis Marine Turbine Co., New York, and inventor of the Curtis Steam Turbine in 1896, and the first American complete gas turbine power plant. A prolific inventor, Mr.

Curtis is most famous for his steam turbine. A combination of his turbine and one previously invented by Sir Charles Parsons, noted English engineer, powers the Cunard White Star liners Queen Mary and Queen Elizabeth. Born in 1860, Mr. Curtis is still active in the engineering world.

Orland W. Boston, professor and chairman of the Department of Metal Processing, University of Michigan, was presented with the Worcester Reed Warner Medal for his contributions to the art of cutting metals which "have improved the productive capacity of American industry, stimulated broader research and enriched engineering education."

To Burgess H. Jennings, professor and chairman of the Department of Mechanical Engineering, Northwestern University, went the Richards Memorial Award for outstanding achievement in mechanical engineering. Prof. Jennings has made significant contributions to the practice and literature of refrigeration and air conditioning.

### **Townsend Company Establishes New Sales Practice**

Breaking with an old tradition in the industry, Townsend Company, New Brighton, Pa., is now selling small rivets by the piece instead of by the pound. This new method follows the general practice in pricing bolts, screws, self-tapping screws and tubular rivets which have been sold by the piece for many years. Nails, large rivets and non-ferrous rivets are the principal fasteners still being sold by weight.

Townsend points out that certain

large consumers such as automotive and farm implement manufacturers have been buying by the piece anyway for a number of years, and the new list is simply in response to growing demand on the part of other customers to buy by units. Originally, the buyer knows how many pieces he wants. At Townsend he is no longer required to estimate the probable weight of a newly designed item—and then order a few pounds extra in case the weight is a little off. Now Townsend takes the responsibility for the count.

### **Lewis John Firth—1858-1950**

Lewis John Firth, who died November 3, 1950, in Pittsburgh, after a prolonged illness, was one of the last of a group of steel makers who pioneered the Tool Steel industry in this country.

Born in England in 1858, at the age of 16 he entered the employ of Thos. Firth & Sons, Ltd., of Sheffield, a business founded by his grandfather in 1840. In 1881 he became a Director of Firth's and later, Joint Managing Director.

On his first visit to the United States in 1874, he spent much time with Jere, Abbott & Company, now Wheelock Lovejoy & Co., who were agents for Firth's (he subsequently made more than 50 trips). The growing American business indicated the need of a plant in this country, and he was instrumental in persuading Firth's to acquire control of the Sterling Steel Company of McKeesport, Pa., a small mill making quality tool steels. The new Firth Sterling Steel Company, with Mr. Firth as president, took over the business in 1897. In 1909, he resigned as Managing Director in England, but until 1944 was a Special Director of Firth's for their interests in the United States.

As an industrial pioneer he was associated with the formation of many steel companies, including the Latrobe Electric Steel Co., the American Stainless Steel Co., the Washington Steel & Ordnance Co., and the Wolf Tongue Mining Company of Colorado to provide a domestic source of tungsten for alloy steels. He shared in the early development of copper clad steel in the Pittsburgh Cold Rolled Steel Co., and

in the first use of centerless grinding at the Globe Wire Co., which later became a Division of Firth Sterling.



**Lewis John Firth**

The above picture of Mr. Firth is a copy of the painting by Malcolm Purcell.

Mr. Firth remained president of Firth Sterling until 1937, when he was succeeded by his son, L. Gerald Firth. He then became chairman of the board of directors until 1944, when at the age of 86 he retired from active business, having completed 70 years in the tool steel industry.

### **Porter-Cable Buys Rockford, Ill. Firm**

De Alton J. Ridings, president of the Porter-Cable Machine Company, Syracuse, N. Y., has announced that his company has completed the purchase of the Johnson Engineering and Sales Corporation, Rockford, Illinois. The purpose of the move is to extend Porter-Cable's line of electric tools in order to provide a complete selection of portable woodworking machines.

The Johnson Corporation manufactures air-driven sanding machines for the furniture and automotive industries. These sanders will become a part of Porter-Cable's Speedmatic line of electric tools which includes saws, abrasive belt sanders, routers, shapers, planes and lock mortisers.

The purchase of the Johnson Corporation is the third major acquisition made by the Porter-Cable Machine Company since the fall of 1948.

# People Moving Up

Name	Company	To	Position
John P. Mullen	Hunt-Spiller Mfg. Corp., Boston	same	Dir. of pub. relations, advtg. & sales promotion
Albert L. Gutferson	Lovejoy Tool Co., Springfield, Vt.	same	President
Frank T. Wruk	Peerless Machine Co., Racine, Wis.	same	Vice Pres. Sales & Service
Gunner E. Gunderson	Brad Foote Gear Works, Chicago	same	President
E. J. Lindgren	Brad Foote Gear Works, Chicago	same	Vice President
E. H. Lamberger	Westinghouse Electric Corp., Pittsburgh	same	Asst. to Mgr. Patent Dept.
Harold V. Barker	Durant Mfg. Co., Milwaukee, Wis.	same	Mgr. Greenville, S. C. branch
Louis M. Teich	Latrobe Electric Steel Co., Phila.	same	Branch Mgr. Phila. office
James M. Stapleton	Carnegie-Illinois Steel Corp., Gary	same	Asst. to Vice Pres. Blast Furnaces
Lawrence H. Russell	Walker-Turner Division, Kearney & Trecker	same	Sales Manager
J. P. Rutherford	General Electric Co., Lynn, Mass.	same	Asst. Mgr. Sales, Lighting Div.
R. J. Swackhammer	General Electric Co., Lynn, Mass.	same	Sales Mgr., Street Lighting, Traffic Control
D. T. Carter	General Electric Co., Lynn, Mass.	same	Sales Mgr., Airport & Floodlight Sales
E. W. McKenzie	General Electric Co., Lynn, Mass.	same	Asst. Mgr. Light Sales
Thomas I. Burbage	Black & Decker Mfg. Co., Towson, Md.	same	Corp. Secretary
Robert E. Cramer	Amer. Steel & Wire Co., Cleveland	same	Chief Eng., Cyclone Fence Div.
W. J. Binder	A. M. Byers Co., Pittsburgh	same	Mgr. Eng. Service Dept.

## ALL INFORMATION, METHODS, AND IDEAS NEEDED TO PRODUCE BETTER TOOLS AND DIES

Practical Data on Popular Analyses of Tool Steels, their Selection, Heat Treatment, and Use

in the Revised, Enlarged SIXTEENTH PRINTING of this

## TOOL AND DIE STEEL HANDBOOK

By Palmer and Luerssen

Here's the BOOK OF ANSWERS for every man responsible for tools and dies. Shows you how to increase your company's production from present equipment—how to reduce toolmaking trial and error, conserve tool steel, avoid die troubles, simplify heat treatment. Gives complete working information on everything from selection of the right steel to heat treating methods and equipment, hardness and toughness testing, latest data on high speed and hot work steels. 564 pages, 355 charts, photos, diagrams give you facts on: how design affects heat treatment, hardenability tests, time required to heat different tools to required hardening and drawing temperatures, furnace atmospheres, quenching, tempering, trouble-shooting.

PLUS 80-PAGE ALPHABETICAL SELECTOR SHOWING WHICH STEEL TO USE FOR ALMOST EVERY TOOL AND DIE. Use this book to train new men and upgrade skilled men.



OVER 100,000 COPIES IN USE! CLIP AND MAIL NOW

THE CARPENTER STEEL CO. • READING, PA. • DEPT. 12X-2

Please send me, postpaid, your revised "Tool Steel Simplified". I enclose \$2.00 (\$2.50 outside U.S.A.) in full payment of the book.

NAME \_\_\_\_\_

TITLE \_\_\_\_\_

FIRM NAME \_\_\_\_\_

MAILING ADDRESS \_\_\_\_\_

CITY \_\_\_\_\_

STATE \_\_\_\_\_

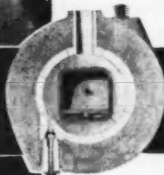
(Please print)

Name	Company	To	Position
Walther L. Hasekotte	Battelle Memorial Institute	Firth Sterling Steel & Carbide Corp.	Asst. Mgr. of Research
John E. Blomquist	Reynolds Metals Co., Louisville, Ky.	same	Industry Mgr. Indust. Parts Div.
Fred K. Knohl	Shakeproof, Inc., Chicago	same	Chief Engineer
James J. Hagan	Weston Elec. Instrument Corp., Newark	same	Asst. Plant Manager
Frank Krause	Denison Engineering Co., Columbus	same	Representative, N. Y., N. J.
Victor P. Preidis	Denison Engineering Co., Columbus	same	Representative, New England
O. W. Klima	Abart Gear & Machine Co., Chicago	same	Chief Engineer
Henry A. Rome	U. S. Rubber Co., New York	same	Mgr. Special Products Sales
William C. Hall	U. S. Rubber Co., New York	same	Mgr. Molded Goods Sales
Thomas S. Savoury	U. S. Rubber Co., New York	same	Mgr. Flooring Sales
Ralph G. Lagerfeldt	Colonial Broach Co., Detroit	same	Exec. Vice-President
Harry Gotberg	Colonial Broach Co., Detroit	same	Vice-President
William Kukuk	Colonial Broach Co., Detroit	same	Factory Manager
Ben F. Wette	Colonial Broach Co., Detroit	same	Chief Engineer
Glen Harmsen	Colonial Broach Co., Detroit	same	Asst. Chief Engineer
M. O. Walker	Carborundum Company, Detroit	Mich. Abrasive Co. Detroit	Chief Chemist
William L. Batt, Sr.	SKF Industries, Inc., N. Y.	ECA	Chief of ECA
William A. Bohlander	Aetna Standard Eng. Co., Youngstown, O.	The Hydraulic Press Mfg. Co., Mt. Gilead, O.	Factory Manager
M. George Bastianello	Remington Rand, Inc., N. Y.	same	Asst. Sales Manager
Richard H. Diesel	The Yale & Towne Mfg. Co., Stamford, Conn.	same	Dir. of Purchasing
Henry D. Bixby	The Battelle Memorial Institute	Pereny Equip. Co., Columbus, O.	Research Engineer
Robert P. Desch		Atlas Mineral Products Co., Mertztown, Pa.	Research Chemist
George Gabriel	Atlas Mineral Products Co., Mertztown, Pa.	same	Asst. Plant Manager
E. F. Schweller	Frigidaire Div., Dayton, O.	same	Asst. Chief Engineer

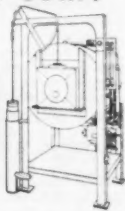
## High Carbon—High Chrome Steel Hardened Without Packing at DE LAVAL



**TANGENTIAL  
FIRING**  
Operating Range  
1200 to 2800° F.



**DELAWARE**  
Controlled Atmosphere  
**FURNACES**



Delaware simplified controlled atmosphere saves preparation and heating time on all steels at De Laval Steam Turbine Company, another Delaware Furnace user.

No work packing . . . no elaborate equipment . . . no wasted time. This one furnace does every heat treating job on every type of tool and alloy steel. Work is free from both scale and de-carburization.

YOU can confidently and economically heat treat in your own shop with the easy-to-operate Delaware Furnace.

INFORMATIVE DATA is in 16-page Bulletin F-1. Send for your copy.

**DELAWARE TOOL STEEL CORP.**  
WILMINGTON 99  
DELAWARE



*That's  
it...* YOU CAN  
CUT COSTS  
and SAVE LABOR!

Get **T-J**  
for **TOUGH  
JOBS**



HYDRAULIC  
CYLINDERS

AIR  
CYLINDERS



RIVITORS



CLINCHORS



CUTTERS



AIR CONTROLS

A tip for you on trimming costs—put T-J products to work in your plant! Engineered to *save labor* and give you *plus performance* in a wide range of applications.

For those "muscle jobs" of pushing, pulling or lifting—100 lb. or 50,000 lb.—save money by mechanizing with T-J Air and Hydraulic Cylinders! For high production in rivet-setting, specify T-J Rivitors with automatic feeding and setting... air or electric power. For setting clinch nuts in automotive body panels, door locks and other products... set 'em 3 to 5 times faster with T-J Clinchors! For more work between grinds in tough die steels... T-J Cutters! For accurate, automatic control of presses, brakes, other machines and equipment... T-J Air Controls.

That's it—get T-J *all the way* for tough jobs! Send for latest catalogs. The Tomkins-Johnson Co., Jackson, Mich.



**TOMKINS-JOHNSON**

RIVITORS AIR AND HYDRAULIC CYLINDERS CUTTERS CLINCHORS

**34 YEARS EXPERIENCE**

Name	Company	To	Position
J. L. Gibson	Frigidaire Div., Dayton, O.	same	Asst. Chief Engineer
F. J. Rataiczak	Frigidaire Div., Dayton, O.	same	Mgr. Household Engineering Dept.
M. W. Baker	Frigidaire Div., Dayton, O.	same	Mgr. Commercial Refrig. & Air Cond. Eng. Dept.
Irving R. Redland	American Radia Hdw. Corp., Mt. Vernon, N. Y.	Frazier & Son, Belleville, N. J.	Asst. to Chief Engineer
N. G. Sixt	Carborundum Company, Detroit	Mich. Abrasive Co., Detroit	Tech. Asst. to V.P.
William F. Winemiller	Norton Co., Refractories Div., Worcester	same	Chief Sales Engineer
Eugene A. Fischer	Norton Co., Refractories Div., Worcester	same	Engineer, New England & N. Y.
Murner E. Thor	Norton Co., Refractories Div., Worcester	same	Rep., E. Canada, N. Y.
David G. Bolan	Norton Co., Refractories Div., Worcester	same	Rep., Ind., Mich.
J. K. Sutherland	Diamond Mach. Tool Co., Los Angeles	same	Sales Manager
Carl F. Herbold	Westinghouse Elec. Corp., Lima	same	Dir. of Mfg. Planning
Walter Donnelly	Sterling Engine Wks., Buffalo	Temkins-Johnson Co., Jackson, Mich.	Works Manager
Elton E. Staples	Havi Duty Elec. Co., Milwaukee	same	Vice-President
L. R. Ludwig	Westinghouse Elec. Corp., Buffalo	Westinghouse, Pittsburgh	Asst. to Vice-President
Charles H. Cox, Jr.	Synthane Corp., Oaks, Pa.	same	Purchasing Agent
Ralph S. Euler	Mellon Nat'l. Bank & Trst. Co.	Allegheny Ludlum Steel Corp., Pittsburgh	Board of Directors
R. A. Snyder	Penn. Salt Mfg. Co., Phila.	same	Tech. Sales Service
J. Cameron Siddall	Penn. Salt Mfg. Co., Phila.	same	Tech. Sales Service
H. Sturgis Potter	Carpenter Steel Co., Reading, Pa.	same	General Sales Manager
Harry W. Pierce	N. Y. Shipbuilding Corp., Camden, N. J.	Amer. Welding Society, N. Y.	President
Charles H. Jennings	Westinghouse Elec. Corp., Pittsburgh	Amer. Welding Society, N. Y.	First Vice-President
Fred L. Plummer	Hammond Iron Wks., Warren, Pa.	Amer. Welding Society, N. Y.	Second Vice-President

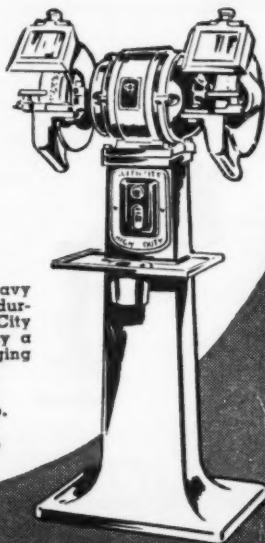


## Cut grinding costs . . . with rugged QUEEN CITY Grinders

Queen City Grinders are built to stand up under the heavy work that pours through the shop daily. Noted for their durability, freedom from downtime and low cost, Queen City Grinders cut grinding costs to the bone. • Order today a battery of these low cost grinders and eliminate "ganging up" around one lone grinder.

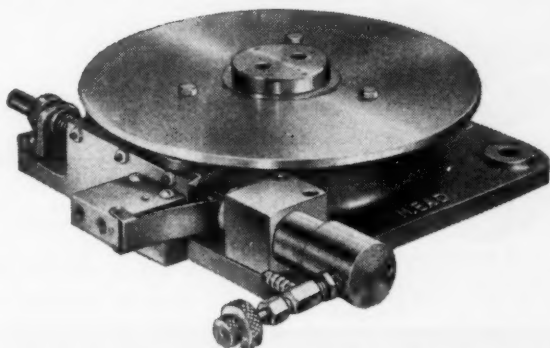
**QUEEN CITY  
MACHINE TOOL CO.**

**QUEEN CITY  
Machine Tool Co.**  
235 E. 2nd St.  
Cincinnati 2, Ohio





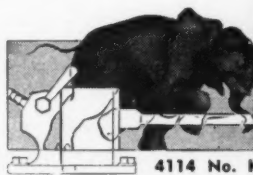
## *Air Operated* **ROTARY WORK FEEDER**



Deftly holds and delivers small parts to drill, tap, swage, stake, etc. Stations accurate to .002". Guaranteed against over-travel or "skipping". Indexes as slow or fast as you like, up to 10,000 per hour. Compact and sturdy, easy to tool and hook up.

Standard dial plate 10"; available in 12". For a new job, simply tool up with a new dial. Readily combines with "MEADMATIC" Timer, Air Hammer, Air Press, Drill Presses, etc. — to make almost completely automatic machine — operator merely loads.

WRITE FOR FULL DETAILS.



**MEAD**  
SPECIALTIES COMPANY

4114 No. Knox Ave., Dept. YA-21, Chicago 41, Ill.

# People work better when they SEE BETTER



**MAGNI-FOCUSER's**  
matched prismatic lenses give needle-sharp magnification. Comfortably light weight. Fits over regular glasses. Leaves both hands free. Normal vision resumed by lifting head.

## MAGNI-FOCUSER SPEEDS PRODUCTION

Precision workers do the job faster and more accurately with a Magni-Focuser — the proven binocular magnifier.

Gauge reading, layout work, inspection, tool and die work are just a few of the jobs that need the Magni-Focuser. Speeds precision assemblies, blue print work. Restores the usefulness of the skilled hands of many older workers whose vision needs a seeing aid.

Now aiding thousands of workers, the Magni-Focuser can help your plant produce better. Immediate delivery. 10-day trial without obligation. Return to us if not satisfied. \$10.50.

Send for descriptive folder.

**EDROY PRODUCTS CO.** 480 Lexington Ave.,  
Dept. 14, New York 17, N. Y.

Name	Company	To	Position
C. Edwin Ponkey	Sheldrick Mfg. Corp.	Int'l. Derrick & Equip. Co., Columbus	General Manager
J. M. Schiavetti	Gerotor May Corp., Baltimore	same	V. P. of Production
Frank U. Hayes	The Bullard Co., Bridgeport	same	Director
Grant J. Casserly	Allison Co., Bridgeport	same	Field Engineer
David R. Falvey	Allison Co., Bridgeport	same	Field Engineer
Stuart H. Smith	SKF Industries, Inc., N. Y.	same	Mgr. Industrial Development
John H. Tipton	SKF Industries, Inc., N. Y.	same	Dist. Mgr. Cincinnati
Emerson D. Ogle	SKF Industries, Inc., N. Y.	same	Asst. Dist. Mgr. Cincinnati
B. K. Lathbury	SKF Industries, Inc., N. Y.	same	Asst. Mgr. Industrial Develop.
I. L. Wallace	Carboloy Co., Inc., Detroit	same	Mgr. of Engineering
J. A. Muldoon	Carboloy Co., Inc., Detroit	same	Mgr. of Manufacturing
R. L. Browlee	Carboloy Co., Inc., Detroit	same	Prod. Mgr. Special Metals
William C. Lilliendahl	Westinghouse Elec. Corp., Pittsburgh	Westinghouse, Bloomfield, N. J.	Research Advisory Engineer
John W. Thompson	Carnenter Steel Co., Reading, Pa.	same	Product Manager
R. A. Gorman	Euro Tool Mfg. Co., L. A.	same	Eastern Sales Representative
A. Aiven	Railway Bearing Co., Inc., Syracuse	Lipo-Railway Corp., Syracuse	General Sales Mgr.
William F. Pioch	Ford Motor Company, Dearborn	same	Mar. Mfg. Engineering
Thomas R. Hughes	Utica Drop Forge & Tool Corp., Utica	same	Vice-Pres. & Sales Mgr.
F. M. Hawley	Borg-Warner, Morse-Chain, Chicago	same	Pres. & Gen. Mgr.
J. N. Candler	Borg-Warner, Morse-Chain, Chicago	same	V. P. & Asst. Gen. Mgr.
R. J. Howison	Borg-Warner, Morse-Chain, Chicago	same	V. P. of Sales
E. W. Deck	Borg-Warner, Morse-Chain, Chicago	same	V. P. of Mfg.-Ithaca
M. V. Durkin	Borg-Warner, Morse-Chain, Chicago	same	V. P. of Mfg.-Detroit
W. M. Reynolds	Borg-Warner, Morse-Chain, Chicago	same	Secretary & Treasurer
E. G. Wuensch	Borg-Warner, Morse-Chain, Chicago	same	Assistant Treasurer
V. P. Burgess	Borg-Warner, Morse-Chain, Chicago	same	Assistant Secretary

120 to 150 pcs. per min.

produced on this Hartford Special

## AUTOMATIC THREAD ROLLER

Completely Automatic Feed

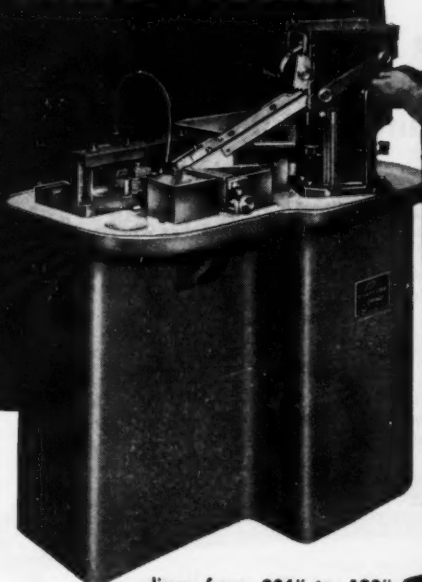
Filtered Lubrication

Table Top Working Level

Vibration Free Operation

Quick, Easy Set-ups

Class 3 Fits



diam. from .086" to .190"  
thread lengths from 1/8" to 1 1/2"

**WRITE FOR BULLETIN NOW!**

**THE HARTFORD SPECIAL MACHINERY CO.**  
287 Homestead Ave., Hartford 3, Conn.

Please send me free Bulletin TR-100 describing your Automatic Thread Roller.

Name \_\_\_\_\_ Pos. \_\_\_\_\_

Company \_\_\_\_\_

Street \_\_\_\_\_

City \_\_\_\_\_ Zone \_\_\_\_\_ State \_\_\_\_\_

**HARTFORD**

*Special*

... the best buy in the long run

**A NEW** time & money saver...

## The NEW Blanchard Wheel Holder Eliminates Sulphuring

Now you can eliminate sulphuring when mounting cylinder and sectored wheels on Nos. 11 and 18 Blanchard Grinders. The new Blanchard Wheel Holder makes wheel mounting a matter of minutes, thereby increasing productive grinding time. Specially designed taper spring clamps, actuated with a wrench, hold wheels solidly and safely in the new ring-type holder. Now there is no reason for not using the right wheel for every job — to get maximum results from your Blanchard every time. Write for new Bulletin giving complete details.

for mounting **BLANCHARD** wheels

Whether you use the new Blanchard Wheel Holder or sulphur, you can't go wrong if you use Blanchard Grinding wheels. 25 years of research, design and manufacturing experience stand back of every Blanchard cylinder, sectored and segment wheel. When you consider production and overall economy — "there is no better wheel for a Blanchard Grinder than a Blanchard Wheel." Write for Blanchard Wheel Catalog.

PUT IT ON THE **BLANCHARD**

**THE BLANCHARD MACHINE COMPANY**  
64 STATE ST., CAMBRIDGE 39, MASS., U.S.A.



ON NO. 11  
BLANCHARD

V-442

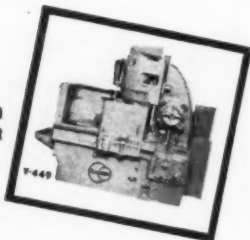


ON NO. 18  
BLANCHARD

CYLINDER

SECTORED

NO. 18 BLANCHARD  
SURFACE GRINDER



V-449



## Foremanship Forum

### Get More Production From Job Methods Training

by Ed Mottershead

We all know that materials are growing scarcer. Machines will be difficult to get or to replace. Manpower is getting daily a more critical issue. A large part of the answer to that three-fold problem is to develop better ways of doing the work we are doing today. Better job methods will save materials, machines and manpower. That is the essence of Job Methods Training, familiarly known as JMT.

Undoubtedly in your plant you have worked out many different better ways of doing this job or that. BUT, are you working out better methods, more short-cuts every day? Are your foremen and supervisors constantly alert to improvements, or are they so pressed by other problems that only occasionally can they look for better methods? JMT offers a way to get better methods now, quickly, by giving the men a logical plan of attacking their production problems so that alertness to improved methods becomes more or less a reflex action on their part.

The principles of Job Methods Training are not new; they have long been used in American industry. Essentially, it brings the methods of the time study and production engineer, the

management engineer, down to practical every-day terms which are readily understood and workable for the average lead man or supervisor.

The training is given to groups of plant supervisors in an intensive ten-hour course of five two-hour sessions. Best results have been obtained in groups of twelve men. Where more than 12 are in the group, there is usually not sufficient time for each man to participate and get individual attention. The material in the course is NOT a discussion of theory, but a practical plan under which participants in the course spend most of their time actually working out job improvements. In fact, experience indicates that 95 out of every 100 men who take this training come in and demonstrate a real improvement in a job method which they have worked out **between the first and second of the five two-hour sessions!**

Job improvement has always been a part of your job. You have been looking for improvements for years. Continued improvement of our basic ideas has made our country what it is. Think of the automobile of 15 years ago; compare it with the cars of today. Remember the radio and the airplane of a few years back? Think of the weapons of modern mechanized war . . . unheard of twenty years ago. All this is the result of improvement. Much of



*Taylor*



**PRECISION  
DRILLING  
MACHINES**

### **Always Look For The FACTS THAT COUNT!**

Here are seven significant facts . . . They represent "HI-EFF" quality features for sensitive, precision drilling. Write for Bulletin 761.

1. Spindle and chuck run-out .0001".
2. Vaporized lubrication of bearings.
3. Spindle supported by 4 select, precision bearings—other moving parts precisely ground and lapped.
4. Solid column for maximum rigidity.
5. Variable speed—800 to 40,000 R.P.M.
6. Radial positioning of drill head.
7. Counter-balanced spindle affords sensitive feather-touch feed.

**Dynamometers • Static Balancers  
Precision Drilling Machines**

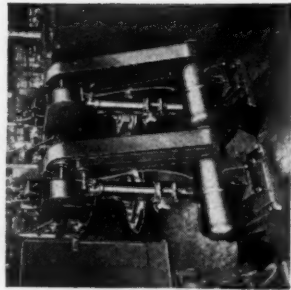
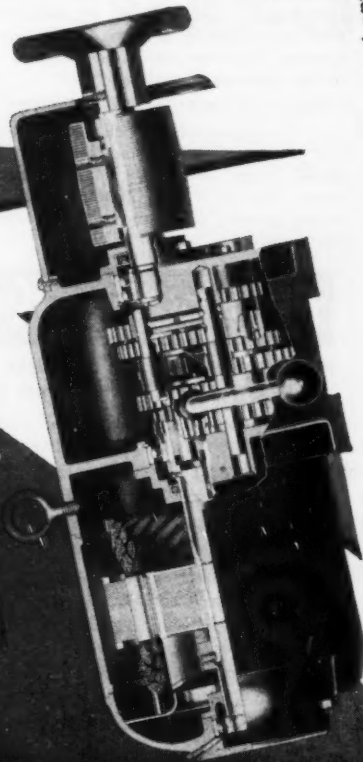
**TAYLOR DYNAMOMETER & MACHINE CO.  
528-T WEST HIGHLAND AVENUE, MILWAUKEE 3, WISCONSIN**

It is due to improvement in design to be sure, but a great deal of it has been made possible by improvements in the METHODS of production. The foremen and supervisors in your plant may not be in a position to do a great deal about design . . . under your contracts you may not be in a position yourself to do much about the design of the articles you are making . . . but you definitely CAN do something about improving the **methods** of production.

Go after the small things. Look for the hundreds of seemingly insignificant details in the production operations. Don't try to plan a whole new department layout or a bit installation of new equipment . . . we haven't time for that. You probably couldn't get the new equipment right away anyway. Look instead for improvements **on existing jobs**, with your present equipment and your present manpower. How?



improved design...



Typical application of Lima Gearshift Drives to automatic tapping machines.  
Photo courtesy International Harvester Company.

● Today's high speed production schedules demand greater machine flexibility than ever before.  
Lima Gearshift Drives, with their improved design, are increasing production and lowering operating costs in progressive plants throughout the world.

If you have a problem in machinery motorization, requiring Drive in the field to a Lima representatives are in the address of the one in your vicinity.

*Representation in principal cities*  
**GEARSHIFT DRIVES & MOTORS**

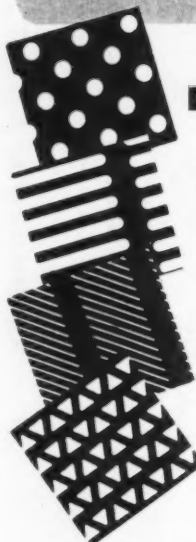
**THE LIMA ELECTRIC MOTOR CO.**



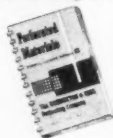
**225 Findlay Road • Lima, Ohio**



**DON'T *Gamble* WITH SCREENS!**



Write today for free  
H & K Catalog 62.



## **H & K PERFORATED METALS**

Precision-perforating where you can't gamble with accuracy. Industrial or ornamental uses . . . special, unusual applications. Metals, plastics, fabrikoids, rubber, treated cloth, and other sheet materials of all gauges. From tissue thickness to heavy steel, 1" thick. Limitless pattern choice.

### **Positive Uniformity**

Tolerances as close as  $\pm .0005"$ . Round perforations from .020" to 9", slots from .006" wide. Strong, smooth, easily cleaned surfaces. Stainless steel and chemical resisting alloys a specialty.

### **Complete FABRICATION FACILITIES**

. . . fully-equipped to roll, shear, braze and weld to specification, such as filter plates, trays, conveyor linings, radiator grilles. Consult H & K for dependable accurate pattern perforations in tune with your production budget.

**The  
Harrington & King  
PERFORATING CO.**

5635 Filmore St.  
114 Liberty St.

Chicago 44, Ill.  
New York 6, N. Y.

The way in which you make improvements is of the first importance. Disciplined thinking is the answer. Some people attack any problem before them by more or less putting the various factors and answers on a carnival turkey wheel and giving the thing a spin . . . wherever it stops is the answer; and if they don't like it, they spin it again, and again.

Go back in your memory as a workman. Remember the time you "put up"

with a job because it was awkward and caused you needless trouble and worry? Can you still remember the better way you worked out which made it easier and safer to do? Remember how you wanted to tell your boss about the idea, but he wasn't the kind of a fellow who was easy to talk to, and you never mentioned it to him? Or maybe you can remember the time the boss sprung his new method and you had to swallow it whole and quick

# So Rugged...

it saves time and costs  
in your toolroom!

**C/R's**

**New JAW-HEAD**

**Rawhide HAMMER**



- Other C/R striking tools: Rawhide Mallets, Rawhide Mauls, Solid Head Rawhide Hammers.

C/R's Jaw-Head hammer is rugged enough for the toughest striking operation. Yet it's extremely gentle to fine finishes and delicate machine parts. C/R replaceable rawhide faces are made from tightly-coiled, resilient water buffalo hide . . . the material that can't be beat for durability and protection. And they're so easy to replace . . . just loosen a nut, change to new rawhide faces, tighten nut and the hammer's ready for use. Safety-Flare grip handle prevents slipping. For the best in "soft" striking tools, get the C/R Jaw-Head Rawhide hammer!

For further information, please write to Dept. 21



- Out with the old face — in with the new!



To release jaws, loosen this nut.



Change to new C/R Rawhide faces.



To tighten nut, use wrench for best results.

Available from leading industrial suppliers.

**CHICAGO** *Rawhide* **MFG.CO.**  
1301 Elston Ave. Chicago 22, Illinois

Chicago Rawhide mallets and hammers are stocked and distributed in Canada by Super Oil Seal Manufacturing Co., Ltd., Hamilton, Ontario.

## Hard to Please?

If you're looking for really fine quality heads, available at the lowest possible price, write or wire us today. Whatever your requirements, we can supply you.

We manufacture all types of multiple spindle, fixed center, adjustable and lead screw tapping heads.

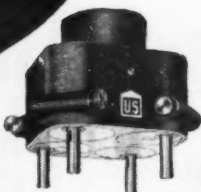
**WRITE TODAY**  
for 1951 Catalog  
Dept. D



Two spindle head unit—one spindle fixed, the other spindle adjustable, for the fixed positions.



Universal joint with slip spindle fixed locating plate.



Single eccentric type for equally spaced holes on bolt circles.



SINCE 1915

**UNITED STATES DRILL HEAD CO.**

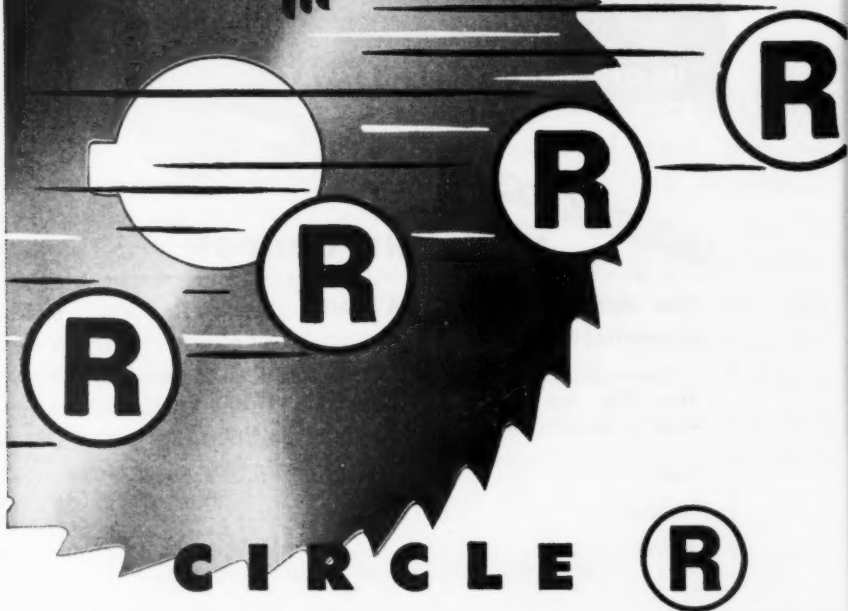
**CINCINNATI 4, OHIO**

... which wasn't so easy. Perhaps, you can recall times when you worked out a new method and tried to sell the idea to the workers around you or under your supervision... and how they balked at the thought of doing something new and different, how they hated the idea of a "speed-up", etc.

JMT is definitely NOT a speed-up. There is inherent in the method no pressure on the worker or machine

operator. It instead aims at making each job EASIER and SAFER so that more is produced with less waste. Better job methods are needed now, desperately, but there is a right way to develop those better methods, so that they will be workable, and so that they can be "sold" to both management, the engineering department, and the workers. The plan which is presented below has worked in literally thousands of cases in almost every kind of industry.

*The Busiest Name  
in Metal Cutting*



**Circular Metal Cutting Tools**

**CIRCULAR TOOL CO., INC.**

PROVIDENCE 5, RHODE ISLAND

CHICAGO • CLEVELAND • DAYTON • DETROIT • INDIANAPOLIS  
BURBANK • MILWAUKEE • NEW YORK CITY • PHILADELPHIA  
PHOENIX • PITTSBURGH • PROVIDENCE • ROCHESTER • ST. LOUIS



**LESS THAN A DIME  
PER KEYWAY**

**WHEN YOU DO IT THIS WAY WITH  
THE *Minute Man*® KEYWAY BROACH**

costing only \$8.25 per broach and bushing  
—good for cutting 100 or more keyways in  
gears, cutters, hubs, collars, couplings, etc.

**IN ONE MINUTE PER KEYWAY**



### **MAIL THE COUPON**

**The duMONT CORPORATION  
Greenfield, Mass.**

Please mail Info Folder and Price List T on Minute  
Man Kits for cutting keyways from 1/16" to 1"  
wide in bores from 1/4" to 3" by 1/16" steps.

Name .....

Company .....

Address .....

#### **For example:**

One company developed a different method of machining the outside circumference of the top plate of the cylinder by designing a fixture for an engine lathe which eliminated the old method of machining on a vertical mill. Output increased by 60% from 40 to 65 pieces per shift, and a simple turning tool is used without undue breakage. Finish has been greatly improved, manual labor and costs substantially reduced.

Another plant worked out a new method to combine two polishing operations on the outside of a cylinder barrel into one operation by using two wheels simultaneously with a spacer between. The suggester of the idea later developed a double wheel. Output was increased by 50% from 64 to 96 pieces per shift by the new method. Formerly, 12 single wheels were used per shift, and under the new method only three double wheels are used per shift due to the greater rigidity of the



---

# **ENGINEERS — MECH DESIGNERS — SCIENTISTS**

## **TO EMPLOYERS:**

We have resumes on hand, ready to submit to you of over a thousand experienced men, scattered nation-wide. Most will relocate for openings that will utilize their fullest capabilities. (No charge to employers for our placement services.) Please send us descriptions of your openings in our fields, including education and experience required, age and salary ranges.

## **TO INDIVIDUALS:**

Thousands of good positions open for men with experience. Your present position may be fully protected by use of "blind" resumes, which may be submitted only for positions specifically approved by you. Write in confidence for full details. Suggestions for preparing resume on request, no charge.

We place only: scientists, mechanical designers, and mechanical, electrical, chemical, ceramic, metallurgical, and management engineers. Our references: Stamford Chamber of Commerce — First Stamford National Bank.

**SCIENTISTS' AND ENGINEERS' ASSOCIATION**  
**24 ROCK RIMMON RD. STAMFORD, CONN.**

Tel. Stamford 2-0911 (Please phone before calling in person.)



## Severance TOOL CATALOG

All cutting tools are clearly described  
in this new edition



MIDGET MILLS for faster, better, finishing. DEBURRING CUTTERS for quick deburring of holes, tubes, pipes, rods, etc. Some styles deburr both OD and ID of tube, pipe, etc. simultaneously. CHATTERLESS COUNTER-SINKS credited with many top production records. TAPER REAMERS, ELECTRODE DRESSERS, CARBIDE HAND FILES and many other Severance designed tools.

Send for your copy today!

CATALOG No. 18

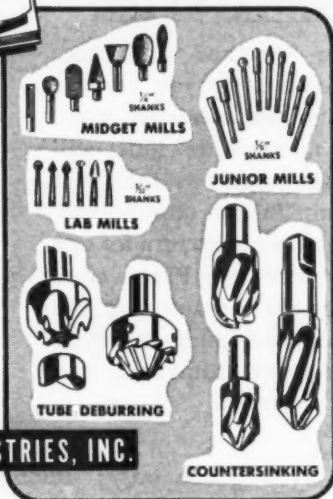
- INFORMATIVE
- ILLUSTRATED
- SUGGESTIVE
- DETAILED

A helpful tooling guide for Plant Superintendents, Production Managers, Engineers, Foremen, Purchasing Agents and all others responsible for keeping production tooling costs down.

**SEVERANCE TOOL INDUSTRIES, INC.**

722 Iowa Ave. Saginaw, Mich.

In Canada: 60 Front St. W. Toronto



double wheel and consequently less wear. A better finish was also obtained.

One plant evolved a way to eliminate two operations on blade rods. The connecting rod is held in a special fixture. The operation is the milling of bosses on the pin end. A hollow mill cutter, descending on the piece, mills the outside surface and radius at the bottom of the boss. The rod is then turned over and the same

operation is performed on the other side. Cutter blades are held in the head. By this means two machines and four men are eliminated, effecting on the one job an annual saving of \$14,000 plus the cost of two machines. There is also some saving of time by eliminating the second set-up.

General Cable Company, after using JMT training on their men reported production increases of from 10%

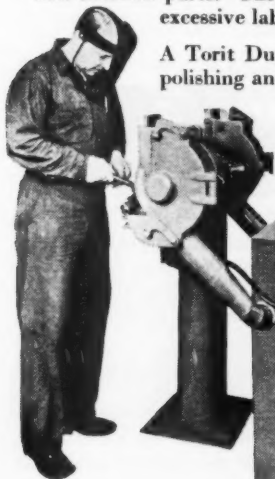
**FOR  
PROTECTION  
IN SPORTS**

*The hockey goalie wears many pounds of protective padding to guard against the knocks and bruises of this grueling winter sport.*



**For protection against industrial dusts use  
TORIT DUST COLLECTORS**

There's danger in hockey, and danger in industrial dusts. Like sharp hockey skates, the dusts in your plant can cut and scratch, damaging expensive machinery and finished parts. They affect employees' health, and are a direct cause of excessive labor turn-over.



A Torit Dust Collector can be the perfect goalie for your cut-off, polishing and grinding machines. It stops all shots, and recirculates the cleaned air. Furthermore, this goalie stays in the game, requiring a minimum of attention and maintenance.

Torit Dust Collectors are compact and self-contained. There are sizes for all standard applications, and special set-ups can be quickly fabricated. For details and the latest Torit catalog, write:

**TORIT**

**Manufacturing Co.**  
303 Walnut St. • St. Paul 2, Minn.



*the  
Only*

PORTABLE ENGRAVER WITH THESE FEATURES

- Engraves 15 sizes from ONE alphabet
- Covers a LARGER area than any other portable
- Equipped with self-centering holding vise
- **Convertible into TRACER GUIDED ELECTRIC ETCHER** for identifying tools and dies

PORTABLE ENGRAVER  
described in Folder 1M-28

HEAVY DUTY ENGRAVER  
described in Folder H-28

*new hermes, inc.*

13-19 UNIVERSITY PLACE • NEW YORK 3, N. Y.

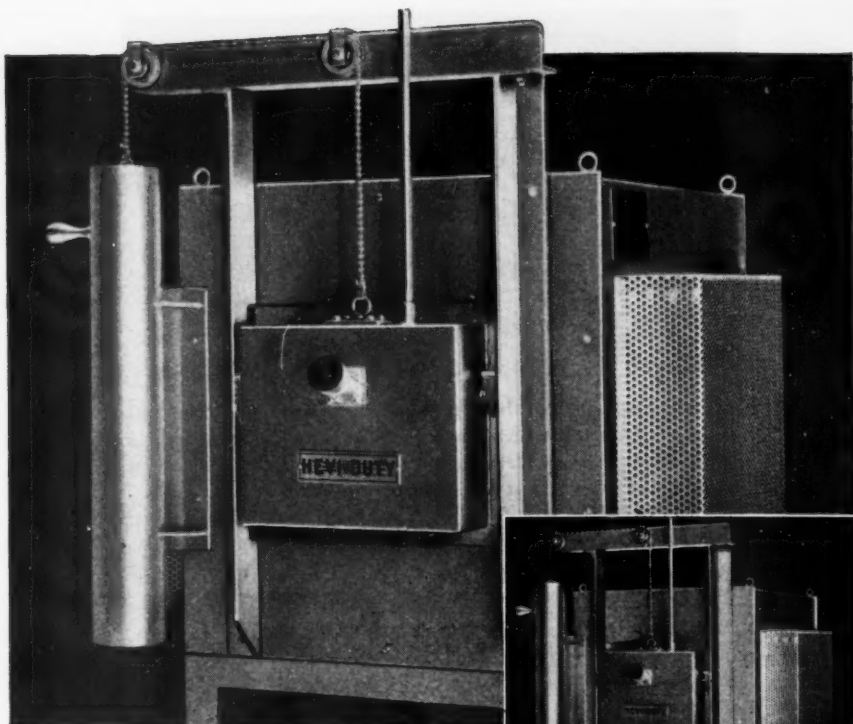
*The world's largest manufacturer of portable engraving machines*

to 55%. On one job, testing field wire, new methods developed saved 25% of the manpower, 10% of the machine time, and over 4,000 feet of wire a day.

In one company, one of the men developed a new design for the holding fixture for grinding form tools. By using this holding fixture, the tool can be very quickly set at the proper angle for grinding with the assurance that it will remain indefinitely in that position. Result: the life of the tool

is increased by accurate grinding and machine scraping of parts is thereby greatly reduced. A saving of approximately 66% is realized in the setting-up operation alone.

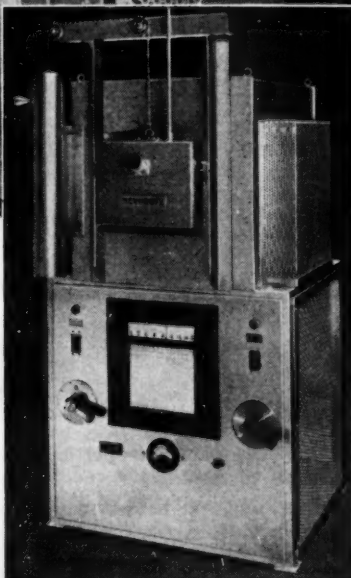
A special socket wrench was devised to facilitate the assembly of the can and rocker bracket, thus eliminating the need to turn bolts by hand until a tongue wrench can be applied. This resulted in increasing production from eight pieces per hour per man to fif-



TEMPERATURES TO 2600° F.  
with this **HEVI DUTY**  
G-8156 HIGH TEMPERATURE  
**BOX FURNACE**

*... for heat-treating operations requiring elevated temperatures for research, ceramics, high speed steels.*

The furnace is available in several sizes with or without the control base as shown in the insert. Transformers, pyrometer and circuit breakers can be supplied as required. Write for bulletin HD-741.



**HEVI DUTY ELECTRIC COMPANY**

HEAT TREATING FURNACES

**HEVI DUTY**

ELECTRIC EXCLUSIVELY

DRY TYPE TRANSFORMERS — CONSTANT CURRENT REGULATORS

**MILWAUKEE 1, WISCONSIN**



***This is it!***

*This cross-section  
tells it's own story  
of how to save  
money on  
production drilling*

## **Meyco Carbide Inserted Drill Jig Bushings**

MEYCO bushings combine the best features of steel and carbide . . . the protection of steel with the long life of carbide at the points of wear. First cost: higher; end result: substantial savings in production costs. Made to ASA standards . . . MEYCO bushings will **SAVE** you money. Don't miss *this* bet! Many sizes now available from stock.

### **User Says:**

"We have a jig setup where four holes are held to a limit of plus or minus .0005" on the spacing. MEYCO bushings were put into service . . . and, after completing 150,000 parts, the bushings show no appreciable wear."



Write for bushing catalog No. 15,  
for further details and a price list.



**W. F. MEYERS CO., INC., BEDFORD, INDIANA**


teen pieces per hour per man, or an increase of 90%.

A welding rod holder, which can be made in various sizes to accommodate different thicknesses of welding rods, was developed in another plant. The hole in the holder should be tapered to keep the rod from slipping out. It saves considerably on welding rods by making it possible to use each rod in its entirety, with no waste whatever.

In another case, a special tool was

devised which combined two coupling rings on a splined arbor, the whole assembly then being set up on an automatic lathe. Formerly, a general dive coupling ring was turned out on a standard lathe and then chamfered in another operation on another machine. Not only are the two coupling rings now turned out at the same time, but the chamfering operation is also completed simultaneously. A saving of approximately 200 man hours a month is






**Carblox**  
... a lifetime  
of accuracy  
in millionths

- Solid carbide, not just tipped
- Thermo guards on large blocks
- Lifetime service
- Individual blocks or as a set

**Webber**  
GAGE COMPANY  
12905 TRISKETT ROAD  
CLEVELAND 11, OHIO

LARGEST EXCLUSIVE MANUFACTURER OF PRECISION GAGE BLOCKS



CARBLOX CARBIDE  
STANDARD STEEL  
BLOCKS  
ANGLE BLOCKS  
H. D. BLOCKS  
and FIXTURES

made, and production is increased some 68%.

One man developed a jig which makes it possible to manufacture tap wrenches out of both scrap cold rolled and tool steel. The tool steel is used at the place where the tap is inserted. Cost of production on tap wrenches of all sizes was cut from what was formerly \$3.00 to \$7.00 each to about 60¢ each.

Hundreds of other cases could be

cited, but you get the idea. Each improvement has been made by the man on the job or by the leadman or supervisor in charge of supervising the job. What has been done there, can be done in your plant . . . by the right method. There are four simple steps to follow. No one step can be omitted. No one step is more important than the other. Here is the method of disciplined thinking taught foremen and supervisors.

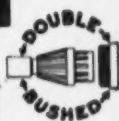
# Whiton

## UNIVERSAL LATHE CHUCKS

All types of mountings



**THIS WHITON  
EXCLUSIVE  
ASSURES LONGER LIFE**



Renewable hardened bushings at either end of pinions give long wearability and stabilize pinion end play.

Rigid individual process inspection and exhaustive tests after assembly guarantee chuck users the best in work holding.

If you have a work holding problem . . .  
**WRITE WHITON. Ask for catalog.**



Makers of Fine Chucks • Steam Turbines  
Centering Machines • Gear Cutting Machines

**THE WHITON MACHINE COMPANY**  
NEW LONDON, CONN.

### STEP I. BREAK DOWN THE JOB.

1. List all details of the job exactly as it is now performed by the present method.
2. Be sure all details are included:
  - a. material handling
  - b. machine work
  - c. hand work

. . . take any job; take the first one you see in your department. Just start right in and jot down

on a sheet of paper every detail of that job just as it happens. Do this right at the job; don't try to do it back at your desk where there is some chance of leaving something out.

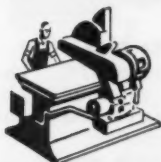
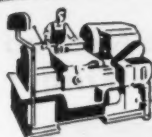
. . . whatever you do, don't be secretive or mysterious about what you are doing. Be frank and open about listing the details. Tell your workers what you are doing and

**ALWAYS BETTER**

**DESIGN**

**PERFORMANCE**

**LIFE**



## **RUTHMAN GUSHER**

### **MACHINE TOOL COOLANT PUMPS**



Grinding, milling, boring, honing, drilling — any metal-cutting operation goes better, faster, more accurately when you use Gusher Pumps to deliver the copious, reliable coolant flow you need.

They're designed by specialists with long experience in building machine tool coolant pumps that are recognized as the best in their field.

You know that your coolant pumps will give you top performance and long trouble-free service when you specify Gusher Coolant Pumps on your metal-cutting machines.

## **THE RUTHMAN MACHINERY CO.**

1816 Reading Road Cincinnati 2, Ohio

why.

#### **STEP II. QUESTION EVERY DETAIL**

1. Use these types of questions in checking every single detail of that job's performance:

- a. why is it necessary?
- b. what is its purpose?
- c. where should it be done?
- d. when should it be done?
- e. who is best qualified to do it?
- f. how is the best way to do it?

2. Also question the:

Materials, machines, equipment, tools, product, design, layout, workplace, safety, housekeeping.

... Just start down your sheet of details, question each one. You usually won't go very far before some improvements will begin to occur to you.

... Perhaps a **BETTER WAY** will flash into your mind. Hold this

# LOCALITES

## for Better Light ON the Job

### *Directs Light Exactly Where Needed as Easily as Pointing Your Finger*

*Designed Especially  
for Machine Tools,  
and Work on Assembly  
and Inspection Benches*



**MODEL 3267-H-174**

Overall length 32 $\frac{3}{4}$ ". Three instantly adjustable joints. Flat oblong base for machine screw mounting.

**\$6.12** EACH in pkg. of 6  
Single Units **\$7.65** ea.

- **Rugged Construction** to stand strains and shocks
- **Instantly Adjustable** with full swivel ball and socket joints
- **Infra-red Baked Enamel Finish**— Exterior, Wrinkled Gray— Reflector Interior, high temperature White
- **Reflector** accommodates 100 watt A-21 medium screw base lamp
- **Wired Complete** with switch socket and 8 ft. oil resistant cord

**WRITE FOR COMPLETE CATALOG**  
of Localite models with various  
type reflectors, arms and bases  
for every industrial use.

**THE FOSTORIA PRESSED  
STEEL CORPORATION**  
**FOSTORIA, OHIO**

*Localites are available  
through selected dis-  
tributors everywhere.*



new idea temporarily and question every detail of your list before you start to dope out the better way. If you stop to work it out, you may help only a part of the job, and overlook a broader or more useful improvement.

... Don't expect to find some improvement in every job the first time you question the details. Just get the system of logical thinking,

of perpetually questioning in your mind, and time after time improvements will occur to you later on.

#### **STEP III. DEVELOP THE NEW METHOD**

1. Eliminate all unnecessary details.
2. Combine details when practical.
3. Rearrange the details for better sequence.
4. Simplify all necessary details.
  - a. make the work easier and safer.

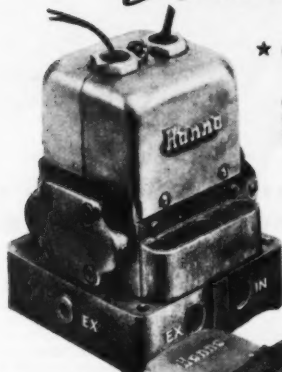
# Hanna®

## 4-way

# Solenoid valves

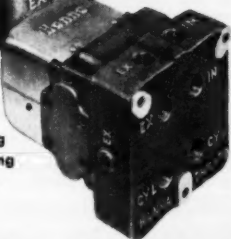
★ BALANCED SPOOL TYPE

★ CONTROLLED BY BUILT-IN PILOT VALVE



Hanna 4-Way  
Solenoid  
Valve . . .

. . . Featuring  
optional piping  
connections.



Hanna has developed this new small, compact 4-Way Solenoid Valve, adaptable to straight line piping with valve capacity equal to rated pipe size.

A feature is the flexible piping arrangement — lines may be connected to bottom, sides, or a combination of both.

Hanna Solenoid Valves, available with single or double solenoid, are made with a maximum of features that make them so practical and efficient for their many applications. Our new valve catalog gives full details.

SEND FOR NEW  
HANNA VALVE  
CATALOG  
No. 254



## Hanna Engineering Works

HYDRAULIC AND PNEUMATIC EQUIPMENT   CYLINDERS   VALVES   PISTONS   RIVETERS

1765 Elston Avenue, Chicago 22, Illinois

- b. pre-position materials, tools and equipment at the best places in the proper work area.
- c. use gravity feed hoppers and drop delivery shutes when practical and possible.
- d. let both hands do useful work.
- e. use jigs and fixtures instead of hands for holding work.
5. Work out your idea WITH OTHERS . . . with workers, manage-

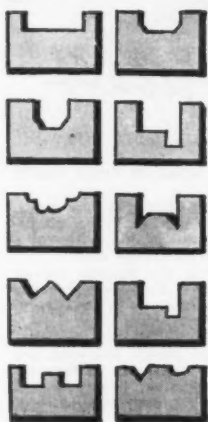
ment, the other foremen, the engineering and design departments.

6. Write up your new proposed method so that it is in clear and understandable form.

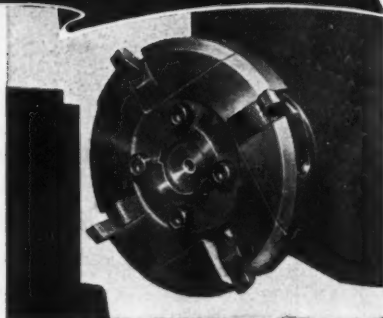
. . . eliminating unnecessary details prevents waste of materials and manpower.

. . . combining and rearranging overcome backtracking and double handling and waste motion.

## Newfield UNIVERSAL FLY CUTTER



Above—a few of the many cuts that can be made with the Newfield Universal Fly Cutter in ONE operation on a horizontal or vertical mill or drill press. Individually adjustable bit holders permit slots of any shape to be cut  $3/16"$  to  $2"$  wide.



Above: FACE MILLING

### STANDARD BITS MAKE 4 TO 6 DIFFERENT CUTS IN 1 OPERATION!

For many types of milling, light metals and plastics as well as steel, there is no longer need for special cutters. A single Newfield Universal Fly Cutter, utilizing any type of standard high speed steel or carbide bits, makes multiple cuts in one operation. In contrast with expensive specially ground cutters, the standard bits used in the Newfield are easily and quickly ground in your own shop, readily replaced or reground for other work, at small cost. There is practically no down-time if a bit is broken.

The Newfield fits all standard arbors, turns to any required speed for fly cutting, slotting, surface and straddle milling, gear cutting, disc and gasket cutting. Standard sizes are  $4"$ ,  $6"$ ,  $8"$ ,  $10"$ . Write for details of this versatile, production-upping, money-saving tool.

Write today for complete information

### NEWFIELD MACHINED PARTS COMPANY

210 West Seventh St., Los Angeles 14, California



... simplifying the job makes it easier and safer to do.

... be sure to get all those affected in on your idea from the start; so they accept it more readily. Don't work out the new method and "spring it" on them. This applies equally to your boss, your associates, and particularly to your workers. The best way of all is to work out your idea WITH them

### ... make them a part of it. STEP IV. APPLY THE NEW METHOD

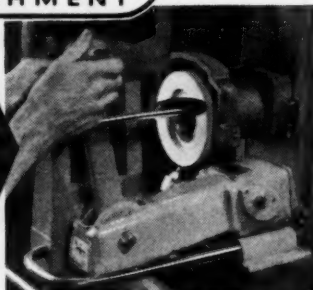
1. Sell your proposal to the boss.
2. Sell your new method to the workers and operators.
3. Get final approval of all concerned on safety, quality, cost, and quantity.
4. Put the new method to work. Use it until a better way is developed.



# PRATT & WHITNEY

## **diaform** WHEEL FORMING ATTACHMENT

**SIMPLY SET IT  
UP ON TABLE OR  
CHUCK OF YOUR  
TOOLROOM SURFACE  
GRINDER — to form  
wheels accurately.  
No altering of  
grinder required!**



**DIAFORM** — Pratt & Whitney's answer to the need for an inexpensive tool for the precision forming of grinding wheels — is one of the most effective time and money savers in the shop. Just mount it on your toolroom surface grinder *without altering the machine in any way*, and you're all set to form and re-form contours of grinding wheels up to 10" dia. x 1" width. By simply following the contour of an inexpensive template with a tracer point, you'll do a precision job of it — to an accuracy of .0005" — in a matter of minutes! Get details from any P & W Branch Office . . .

**PRATT &  
WHITNEY**

Division Miles Bement Pond Company  
WEST HARTFORD, CONNECTICUT



Birmingham • Boston • Chicago  
Cincinnati • Cleveland • Detroit  
Los Angeles • New York • Philadelphia  
Pittsburgh • Rochester • St. Louis  
San Francisco

### 5. Give credit where credit is due.

. . . remember, today's best way is only for today. Tomorrow there will be a better way and you can work it out.

. . . stealing an idea is really a form of sabotage. Be open minded to suggestions, even if many are wild ideas. A really good one will come along sooner or later that may make a real contribution. And give it credit.

Many times a new method will pop into your head without working through the four-steps of the formula outlined above. This can be expected at the start of things, but these mental flashes will relatively soon become exhausted. Don't expect them to continue, and don't depend upon them indefinitely for the needed improvements and short cuts to your production problems. For consistent improvement you need to think your way carefully through

# Chicago "ADJUSTABLE" SHOP SPOT-LIGHT



MODEL 2000-1

## for "On the Spot" lighting

Chicago shop lights are designed to place light at the exact spot desired. Just a touch of the hand performs this operation.

**NO SCREWS TO ADJUST—NO NUTS TO TIGHTEN**

Each arm is equipped with horizontal and vertical swivels for 100% flexibility.

Shop lights come in a complete range of sizes and can be purchased with various types of mountings.

All models have Underwriters approved cords, plugs and sockets. Each model is finished in grey baked enamel and comes complete with green parabola shade.

The No. 2000-1 shop light is one of our most popular models. This light can be mounted on either horizontal or vertical surfaces. Available in 24", 30", and 44" lengths.

**\$5<sup>25</sup>** ( EACH in lots of 12  
Quantities of 6 @ \$5.95 ea.  
Single Units @ \$7.95 ea.  
F.O.B. Chicago, Ill.



Manufactured by  
**Chicago DIE CASTING MFG. CO.**

2515-17 West Monroe Street  
Chicago 12, Illinois

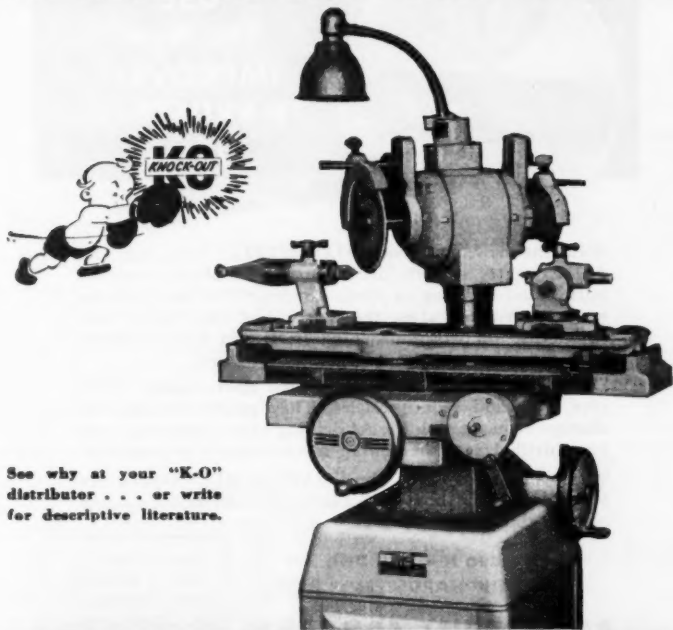


all of the four steps outlined above, and really make an effort to dig below the surface of apparent operations for the improvements which are possible.

Remember, your purpose is to make the jobs easier and safer, not to make people work harder and faster. This is not a speed-up plan as such. It is to show people how to work more effectively with the tools and materials at hand to do existing jobs. Keep this

basic purpose clearly in mind, and you can't go wrong. Furthermore, you will find that improving job methods is an interesting undertaking, giving you a chance to make a most important contribution to victory. And when other foremen, your workers, top management cooperates with you in developing the new method and making it a success, be sure that everyone gets proper credit for his or her share in things. Failure to give credit has

# There's a reason... 85% of all popularly-priced Tool and Cutter Grinders sold are "Knock-Outs"



See why at your "K-O"  
distributor . . . or write  
for descriptive literature.

**K. O. LEE CO.**  
**ABERDEEN, SOUTH DAKOTA**

killed many good ideas. It is the key-stone of industrial relations and progressive industrial engineering.

Why does JOB METHODS TRAINING get such apparent good results so quickly? First, because the program is fundamentally sound and practical. Second, because it is expressed in simple terms, in an easily remembered formula, which every foreman and supervisor can apply readily in his

daily work. And third, the most important . . . indeed unfortunate, according to conservative estimates . . . the field of work (JMT) is in itself large. In the average plant, 30% to 50% of the manpower, 40% of the machine capacity, and 35% of the materials are now wasted. That is a strong statement, but it is fundamentally true . . . true because we have for years been neglecting the countless

## Drill Hardened Steels without Annealing —



With the new, improved "HARDSTEEL" Drill, you can do accurate, smooth drilling, countersinking, counter-boring and reaming in steels hardened by any process without first annealing the work. And they work with equal ease on work-hardening steels and high carbon-high chrome steels of any degree of hardness.

"HARDSTEEL" Drills fit standard drill presses. They save time and reduce rejects. They permit engineering changes requiring additional drilling after hardening. And parts drilled after hardening always match at assembly.

Write for a copy of the "HARDSTEEL" Operators Manual showing how "HARDSTEEL" drills are cutting costs in thousands of plants.

**You Harden It—We'll Drill It—  
With "HARDSTEEL"**

### **BLACK DRILL COMPANY**

Division Black Industries

1374 East 222nd St. • Cleveland 17, Ohio

**Also makers of—  
BLACK DRILLING  
UNITS—AUTOMATIC,  
SELF-CONTAINED—  
FOR COST-CUTTING  
PRODUCTION ON  
ALL MATERIALS**

**Write for information**

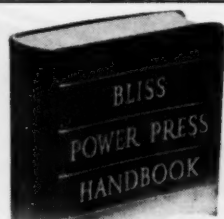
"little things" in our production operations, true because in improving methods we have to dig and dig deep beneath the surface to get broad and useful improvements, true because American ingenuity is practically without limit. If you use the formula and follow the planned method of finding improvements conscientiously, these wastes in materials, machine capacity and manpower will be reduced.

The improvements in the plants which have had JMT training are all worked out in the shop by the foremen and leadmen themselves, without the aid of outside experts, time and motion men, industrial management engineers and the like. It should be so. It is part of their job to think as well as work. They have plenty of brains, and JMT gives them a practical plan, an easy track to run on. Using it, they

have the assurance of management's support and the cooperation of the workers. They know how to tackle a job for improvement by making a breakdown, questioning details, and developing and applying the new methods to increase production of vital war materials.

If you are looking for improvements, they can be found within your own plant by your own men. If you want JMT training, all you have to do is to write the editors of **MACHINE & TOOL BLUE BOOK**, and additional information will be sent you without cost. The End.

"The A-B-C's of Aluminum", a 96-page booklet, tells who discovered aluminum, what it is, how it is made into products, and why it is used so extensively. Profusely illustrated, it has tables of contents and itemized cross index. Reynolds Metals Co., 2500 So. 3rd St., Louisville, Ky.



**JUST  
OFF  
THE  
PRESS!**

**Completely New  
700 Pages, 450 Illustrations**

**Sections on:**

- Easy methods of computing press jobs •
- How to select the proper type of press •
- Useful engineering tables • Die illustrations
- Glossary of terms used in the pressed metal industry.

Plus a complete service section covering all types of Bliss presses, old and new. \$7.50.

**E. W. BLISS CO.**

(Handbook Department)

1426 Hastings Street, Toledo 2, Ohio

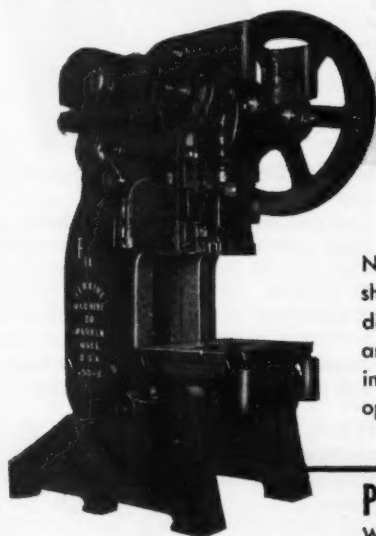
Rush me a copy of the Bliss Power Press Handbook

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

I am enclosing \$7.50..... Bill me .....



**IMPROVED PERFORMANCE  
WITH  
PERKINS Model No. 650 B**

New Model 650 B press with tie rods shrunk in frame for extra rigidity. Higher die space with greater depth of throat and larger bed area. New design inclining mechanism can be safely and easily operated by one man.

WRITE FOR YOUR COMPLETE INFORMATION BULLETIN

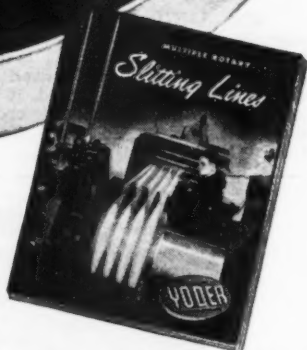
**PERKINS MACHINE COMPANY**  
WARREN, MASSACHUSETTS, U. S. A.

**PRESS BUILDERS FOR 50 YEARS** *Presses built to special specification.*



# *Investigate*

## THE ADVANTAGES OF DOING YOUR OWN SLITTING



Send for this book—a practical discussion of important questions as to operation, production and cost.

It contains time studies of output per cycle and per day, in slitting different widths, gauges and coil weights.

It shows how cycle time is affected by these and other factors; advantages of big coils and high speeds for big tonnages; economies of smaller, less expensive, standardized sizes

of slitters for the more moderate requirements of most metal working plants.

Cost analyses show how Yoder slitters, operating only three or four days per month, often pay for themselves in a year or two. In addition, they greatly reduce inventory requirements of slit strands and facilitate production planning.

Phone or write today for free copy. Estimates and recommendations for the asking.

**THE YODER COMPANY • 5509 Walworth Ave., Cleveland 2, Ohio**

### Complete Production Lines

- ★ COLD-ROLL-FORMING and auxiliary machinery
- ★ GANG SLITTING LINES for Coils and Sheets
- ★ PIPE and TUBE MILLS—cold forming and welding







# MTBB

FEBRUARY, 1951

## Available Literature

1. **Automatic Lathe**, model 12A, has quick cycle change-over for short and long runs. An 8-page folder gives specifications, detailed sketches, and application data. **Sundstrand Machine Tool Co.**, Rockford, Ill.

2. **Flexible Rezipor and All-Hard Rezipor** hack saw blades are described in two folders which illustrate applications, and include metal cutting hints, etc. Available from **Henry G. Thompson & Son**, New Haven 5, Conn.

3. **Dust Collectors**, self-contained, portable units for grinders, polishing machines and similar applications and accessories are discussed in a 23-page catalog, No. 35. Blowers, exhausters, and dust separators also included. **Torit Mfg. Co.**, 303 Walnut St., St. Paul 2, Minn.

4. **Engineers'-Glass**, translucent and scribing makes possible high precision, and accurate charts for optical projection comparators. 44-page catalog, No. 9, also describes standard charts, scales and rules, staging fixtures, and accessories. **Engineers' Specialties Div., The Universal Engraving & Colorplate Co., Inc.**, 980 Ellicott St., Buffalo 9, N. Y.

5. **Micro Grinder** features smooth finish and accuracy, grinds wet or dry, for crush-form work, diamond wheels, etc. Description and specifications given in new folder. **Sanford Mfg. Co.**, 1020-28 Commerce Ave., Union, N. J.

6. **Steptoe-Western 12" & 15" shapers** are equipped with universal table, vee belt drive, and eight automatic feeds, etc. Catalog No. 5022, 8 pages, describes and illustrates these shapers. **Western Machine Tool Works**, Holland, Mich.

7. **M & N Presses** are successfully used for drawing, forming, powder metallurgy, silversmithing, punching, stamping, and other uses. Folders and catalogs covering entire line of presses are available from **M & N Machine Tool Works, Inc.**, 299 Allwood Rd., Clifton, N. J.

8. **Delta Catalog AB-50**, 60 pages, describes metalworking and woodworking machines, 53 machines, 246 models, and more than 1300 accessories. Also product specifications, prices, motor recommendations. **Delta Power Tool Div., Rockwell Mfg. Co.**, 604 N. E. Vienna Ave., Milwaukee 1, Wis.

9. **Draw-In Collets**, for all lathes and millers, are listed in bulletin No. 50. Included are major dimensions, maximum capacity for round, square, and hexagon, collet adaptation for nose type chucks, and prices. **Hardinge Bros., Inc.**, Elmira, N. Y.

10. **No. 2 Jig Borer** accurately locates holes within .00025" over a range of 10½" x 16½" for drilling, boring, reaming and spotting. Descriptive 24-page catalog contains action photographs, examples of toolroom and production jobs and describes accessories and cutting tools. **Moore Special Tool Co., Inc.**, 728 Union Ave., Bridgeport 7, Conn.

11. **Sunvis H. D. 700 Oils** keep machines clean, prevent rusting, withstand heavy bearing loads, do not foam, etc. Twelve-page booklet is available by writing **Sun Oil Co.**, Philadelphia 3, Pa.

12. **Flexible Shaft Machines**, equipped with five quickly interchangeable hand-piece types, are discussed in 8-page catalog No. 170, as well as heavy and light duty flexible shaft machine kits, drill press attachment, Flexade, and Presto-Flex, etc. **Foredom Electric Co.**, 27 Park Pl., New York 7, N. Y.

13. **Thermocouple Connectors**, plugs and jacks, are mechanically interchangeable and have long life under hard usage. Four-page section 23 describes and illustrates connectors and panels. **Thermo Electric Co., Inc.**, Fair Lawn, N. J.

14. **Weldirectory** for stainless steel, bulletin 463, describes and illustrates various electrodes, such as Stainweld A5-Cb, A7, B-Cb, Chromweld 4-6, in seven pages.

# 3 HI-SPEED AUTOMATIC PRESSES

5 TON

8 TON

12 TON

CLUTCH  
AND  
AUTOMATIC  
BRAKE  
RELEASE

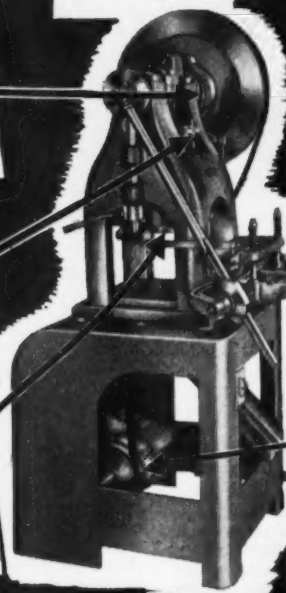
POSITIVE  
KNOCKOUT  
FOR  
COMPOUND  
DIES

CYLINDER  
TYPE RAMS,  
ADJUSTABLE  
BRONZE  
SLEEVE

FAST  
EFFICIENT  
ACCURATE

SINGLE  
OR  
DOUBLE  
FEEDS

VARIABLE  
SPEED  
DRIVE



*Write*

**DI MACHINE CORP.**

2712 W. IRVING PARK RD.

CHICAGO 18, ILLINOIS

Typical applications are also listed. The Lincoln Electric Co., Cleveland 1, Ohio.

15. Flo-Set Speed Control Valves with micrometer adjustments have new precision speed control. Available in  $\frac{1}{4}$ ",  $\frac{3}{8}$ " and  $\frac{1}{2}$ " sizes. Bulletin 253 discusses these valves. Hanna Engineering Works, 1765 Elston Ave., Chicago 22, Ill.

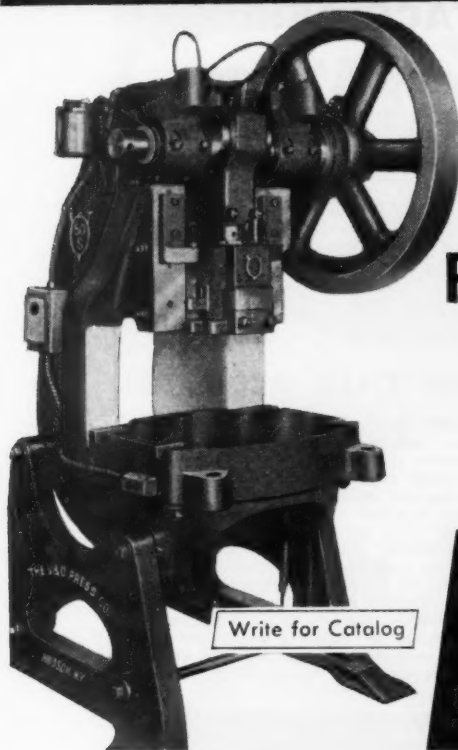
16. Milling Machines, Nos. 4, 5 and 6 plain and universal, 25 h.p., feature spindle mounted flywheel and exclusive No. 60 heavy duty drive flange on spindle end. Data sheet No. CK-25 gives complete specifications. Kearney & Trecker

Corp., 6784 W. National Ave., Milwaukee 14, Wis.

17. Rusnok Mill Head has a larger spindle to accommodate a greater range of tools, and tapered bearings for smoother and trouble free operation. Illustrated 14-page catalog discusses this attachment and precision parts and special brackets. Rusnok Tool Works, 4840 W. North Ave., Chicago 39, Ill.

18. Sulphur and Chemical Additives add greater stability, detergency, load-carrying capacity, cutting efficiencies, oiliness, corrosion and oxidation control to re-

WANTED *Most* FOR HIGH ACCURACY STAMPING OPERATIONS



# V & O

## LONG SLIDE *Precision* POWER PRESSES

Faster stamping operations . . .  
longer die life assured by many  
advanced engineering features  
—including the exclusive V&O  
long slide for accurate guiding.  
Made in sizes from 3 to 105-  
ton capacity—inclinable type.

Write for Catalog

**THE V & O PRESS COMPANY**  
DIVISION OF HARTFORD-EMPIRE COMPANY  
Builders of Precision  
POWER PRESSES and FEEDS  
Since 1889 HUDSON, N.Y.

fined oils. Fifteen-page booklet gives several formulas of these additives. **Burns Laboratories, Inc., Indianapolis, Ind.**

19. **Toolmaker Microscope**, model No. 1, accurate to 1/10,000th of an inch, has a large range and capacity, and makes quick measurements on small and large dies. Additional features given in 4-page bulletin. **Bockeler Instrument Co., 31 E. Rillito St., Tucson, Ariz.**

20. **Roller Conveyors** handle steel sheets up to 35,000 lbs. "Escalator" system for handling and flow of materials, tube and spiral chutes, conveyors for airplane parts, etc. are described in an 11-page bulletin, No. 67. **Standard Conveyor Co., 50 Indiana Ave., N. St. Paul 9, Minn.**

21. **Power Auger Bit**, for use in power

driven drill presses, rotary and pneumatic drills, or portable electric hand drills, drills to any depth, and can't slip in chucks, etc. Pamphlet introducing this tool may be had from **Chicago-Latrobe, 411 W. Ontario St., Chicago 10, Ill.**

22. **Longlife** protects and preserves metal roofs, old and new, corrugated or flat. Recommended for structural steel and caulking, metal ducts and stacks. Folder available from **Flexrock Co., 3634 Filbert St., Philadelphia 4, Pa.**

23. **Cam Manufacturing Service**. No cam too large or too intricate for this specialized staff. Leaflet illustrating various kinds of cams which have been made may be secured from **L. G. Schlecht &**

**ROGERS**

## PRODUCTION FACE GRINDER

**NT-20**

### HIGH SPEED, ACCURATE

**Medium duty grinding** . . . rough and finish grinding of gear boxes, pump housings, die blocks and countless other flat steel or metal parts . . . can be quickly and accurately handled by this sturdy ROGERS NT-20. Variable speed motor table drive, separate high HP motor for 20" grinding wheel, automatic (or manual) cross feed, finger-tip controls and the availability of magnetic chucks make the NT-20 a highly versatile grinder. And, too, its moderate price makes it the only machine in its price range for medium duty grinding. The NT-20 is designed and built by the oldest manufacturer of grinding equipment in America . . . since 1887. Also manufacturers of machine knife and shear blade grinders. Write today for further information.

*A Leader in Grinding Equipment Since 1887*

## **SAMUEL C. ROGERS & CO.**

**207 DUTTON AVENUE****BUFFALO 11, N. Y.**

Son, Inc., 1626 N. Astor St., Milwaukee 2, Wis.

**24. Screw Driving Machines** with magazine feeds feature high speed and accurate control of driving action. Various models described in catalog. Cook & Chuck Co., 640 S. Miller St., Chicago 7, Ill.

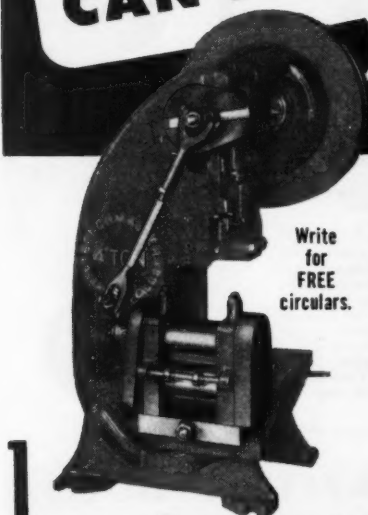
**25. Zero-Max**, a beltless, gearless, non-hydraulic transmission with infinitely variable speed from zero to maximum, is discussed in a 4-page folder. Table of motor recommendations also included.

Revco, Inc., Dept. MTBB, 407 Thorpe Bldg., Minneapolis 2, Minn.

**26. Gear Driven Positioners**, heavy duty, are designed for ruggedness and precision-built for automatic welding. Bulletin HD 1 illustrates and describes this tool. Specifications of other models from 2500 lbs. to 8000 lbs. capacity are also included. Aronson Machine Co., Arcade, N. Y.

**27. Electron Drill**, a complete operating unit, is equipped with motor driven automatic feed and 36" electrode, for pro-

**AUTOMATIC FEEDING  
CAN'T MISS,  
CAN'T FORGET!**



Write  
for  
**FREE**  
circulars.

**1/3 THE COST**  
you'd expect to  
pay! Step-up pro-  
duction, increase  
operator safety,  
with the new  
**BENCHMASTER**  
**FRICTION**  
**ROLL FEED**

5 sizes—from 1 1/2" to 9"  
widths. Adaptable for all  
presses.

**benchmaster PUNCH PRESSES  
AND MILLERS**

2952 West Pico Boulevard, Los Angeles 6, California

duction cutting of large and small holes in hardened metals and removal of taps, drills and reamers in all sizes. Folder available from Elox Corp. of Michigan, 744 N. Rochester Rd., Clawson, Mich.

28. **Portable Tool** catalog, 72 pages, illustrates and describes electric and pneumatic tools, includes specifications and features, applications and uses on saws, drills, sanders, detailed product photographs, individual tool sections. Skilsaw, Inc., 5033 Elston Ave., Chicago 30, Ill.

29. **Weldesign**, 4-page illustrated bulletin

No. 805 gives actual case history on how welded design accomplishes product improvements and service economy. Available from Lincoln Electric Co., Cleveland 1, O.

30. **Motor Starters**, type H, are built for full or reduced voltage, reversing or non-reversing, with plugging, dynamic braking and multi-speed features. Contactors, protective devices, meters, and relays are also discussed in a 12-page bulletin, 14B6410A. Allis-Chalmers Mfg. Co., 1007 S. 70th St., Milwaukee, Wis.

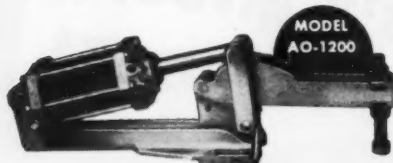
31. **Welding Accessories** catalog, 32 pages,

# NOW

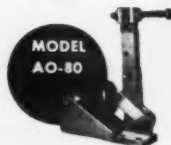
New air-operated clamps with toggle-bar force

*from Feather-touch to OVER A TON*

... another example of design leadership to provide simultaneous multiple clamping and solve your SPEED-PRODUCTION problems.



MODEL  
AO-1200



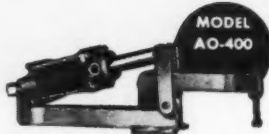
MODEL  
AO-80

Consult us direct or our representative engineer near you

Buffalo, N. Y., J. H. England  
Chicago 20, Ill., Larry F. Wood  
Columbus, Ohio, Arthur Gangloff  
Dallas 2, Texas, C. G. Wilson Co.  
Dayton, Ohio, W. F. Grimes  
Detroit 2, Michigan, 1144 W. Baltimore  
Glendale, Calif., Art Lewis Prod.  
Equip. Co.

Houston, Texas, L. H. Creasy  
Indianapolis, Indiana, E. M. Lewis  
Kansas City, Kansas, L. N. Wood  
Milwaukee 9, Wisc., K. W. Stoffregen  
Minneapolis 4, Minn., Midwest Mach.  
Tool Supply

New York 17, N. Y., V. A. Chern  
Oakland, Calif., Bues Prod. Equip. Co.  
Philadelphia, Pa., Jackson-Walter Co.  
Seattle, Washington, Norwes Company  
St. Louis, Missouri, Moehlenpach Engr. Inc.  
Poland, Ohio, P. L. Duer



MODEL  
AO-400



MODEL  
AO-200

Send for new folder giving further information

**KNU-VISE  
PRODUCTS**

**LAPEER MFG. CO.**

**3056 DAVISON ROAD • LAPEER, MICHIGAN**

**WESTERN DIVISION  
422 MAGNOLIA ST.  
GLENDALE, CALIF.**

**CANADIAN STOCKING DIST.  
HIGGINSON ENGR. SALES  
P.O. BOX 23  
HAMILTON, ONTARIO**

covers holders, helmets, cables, ground clamps, goggles, cleaning tools and protective clothing with specifications and data on replacement parts. **Metal & Thermit Corp.**, 100 E. 42nd St., New York 17, N. Y.

**32. Flame Hardening** equipment is described and illustrated in a 20-page catalog 4. Gas control equipment, pipeline systems and hardening special shapes are also discussed. **Air Reduction**, 60 E. 42nd St., New York 17, N. Y.

**33. Abrasive Wheels** for tool and cutter grinding, horizontal surface grinding and carbide tool grinding are described in

4-page bulletin ESA-197. Popular sizes and shapes of wheels for this class of grinding also listed. **Simonds Abrasive Co.**, Tacony & Fraley Sts., Philadelphia 37, Pa.

**34. Locknuts**, such as dardelet rivet-bolt, Gripco lock nut, hi-stress, Marsden nut, Townsend tufflok nut, etc. and their principles of operation are discussed in a 17-page catalog published by **Locknut Section, Industrial Fasteners Institute**, 3648 Euclid Ave., Cleveland 15, O.

**35. Powerstat** variable transformers and line correctors, with product photographs, performance curves, graphs, and



# the "POCKET SIZE MACHINE SHOP"

DREMEL MODEL 2 MOTO-TOOL KIT



**Moto-Tool Kit No. 2** contains 23 accessories, including **high speed steel** cutters and Model 2 Moto-Tool in natural finish hardwood case. **\$23.50**

**Moto-Tool No. 2**, with one emery point. **\$16.50**

For burring and grinding parts; grinding and polishing dies; marking tools; sharpening cutters—for these and many other operations, the Dremel Moto-Tool is speeding production and saving labor in industries—large and small. Moto-Tool has oil-sealed bearings for long life, dynamically balanced armature for vibrationless operation . . . delivers 27,000 r.p.m., yet weighs only 13 oz. If your mill supply dealer cannot supply you, please write us.



**DREMEL MFG. CO. • Dept. 211-B • Racine, Wis.**

wiring diagrams, are discussed. Data included on Voltbox a-c power supplies, oil-cooled Powerstats and explosion-proof Powerstats. Sixteen-page bulletin P550. R. F. Greene, Advertising Mgr., The Superior Electric Co., Bristol, Conn.

**36. Presses**, single-crank OBI and gap, are described in 8-page bulletin 1000 including the newly developed Alcone clutch for larger models. Two basic designs which make up this line are also illustrated and discussed. Columbia Machy. & Engineering Corp., Hamilton, Ohio.

**37. Motor Generators** 8-page booklet

GEA-5506 covers sets from 30 to 8000 kw such as rolling-mill motors, electrolytic refining of ores, motion picture lighting, mining, etc. Illustrates typical installations and describes construction features. General Electric Co., Schenectady 5, N. Y.

**38. Hi-Temp Oils** to meet all high temperature conditions up to and over 500° F are discussed in a well illustrated leaflet showing the results of a research program on high temperature lubrication. E. F. Houghton & Co., 303 W. Lehigh Ave., Philadelphia 33, Pa.

**39. Universal Camera Microscope**, simple to use, produces perfect and un-

FOR **High Production**  
AT **Low Cost** USE  
**Staples**

**The QUALITY Tools**

FOR years, Staples Expansion and Solid Reamers and other carbide-tipped cutting tools have been known for their superior performance. You can specify Staples Tools with the assurance that their quality is never lowered to meet a price.

For higher output per tool and more work between tool grinds, put Staples carbide-tipped tools to work in your production.

If your requirements for *special tools* are slight alterations of standard tools, Staples can meet your special requirements and ship within several days.

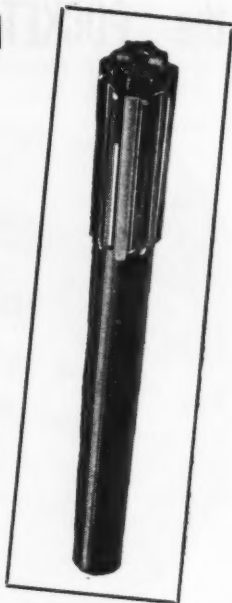
**Tell us your requirements. Send for complete tool catalog.**

**THE STAPLES TOOL COMPANY, Cincinnati 25, Ohio**

**Staples**

**Distributors in Major Cities  
CARBIDE-TIPPED CUTTING TOOLS**

A COMPLETE LINE OF SINGLE AND MULTIPLE POINT CUTTING TOOLS  
EXPANSION REAMERS — FORM TOOLS — CENTERS — MASONRY DRILLS  
SPECIAL TOOLS



equaled results. Both metallography and photo-micrography can be carried out. Illustrated bulletin describes this and micro hardness tester. **Wm. J. Hacker & Co., Inc., 82 Beaver St., New York 5, N. Y.**

**40. Modu Wave Welder**, 3-phase, tailors the wave shape of the welding current to conform with the nature of the material being welded. Will meet Air Force-Navy and aircraft specifications. Descriptive bulletin 134-ST. **Sciaky Bros., Inc., 4915 W. 67th St., Chicago 38, Ill.**

**41. Stock Gears**, sprockets, speed reducers and industrial equipment are listed and

described in catalog No. 65 covering 176 pages. Also includes tables of specifications and prices. **Charles Bond Co., 617 Arch St., Philadelphia 6, Pa.**

**42. Small Tools**, chucks, collets, lathe centers, standard type drill sleeves, square hole taper shank socket, and steel sleeves, are described and illustrated in several bulletins. Specifications and prices also given. **The Collis Co., Clinton, Ia.**

**43. Polyken No. 163 Electrical Tape** features higher dielectric strength, better moisture barrier, sticks quicker, stays

**ONLY ERICKSON Speed Indexers**  
give you

**AUTOMATIC  
INDEXING**  
**at LOWER  
COST**



Designed to Speed  
Up and Simplify  
Positioning and  
Holding Operations.

CAN BE USED IN  
Horizontal or Vertical Positions

### Indexer Prices Start At Only \$240.00

Speed up those time consuming index jobs, bring production costs down. Look at these exclusive Erickson Features:

1. Positive locking independent of air or hydraulics.
2. Longer Spindle Bearing for rigidity—accuracy.
3. Easy adaptability for automatic operation—micro switch can be used directly with plunger pin which engages index plate.
4. Adjustable to 4, 6, 8, 12, 24 positions.
5. 400 series adaptable up to 50 positions.
6. 600 series adaptable up to 100 positions.

#### NEW 3-POSITION INDEXER

Now, operations requiring 3 divisions (120°) can be done faster, at lower cost, with easily adapted Erickson 3-Position Indexer!

**WRITE TODAY FOR FULL DETAILS**

## ERICKSON TOOLS DIVISION

2315-C Hamilton Ave.

Cleveland 14, Ohio

cleaner, etc. "Test It Yourself", descriptive folder, is available from Polyken Industrial Tape, 222 W. Adams St., Chicago 6, Ill.

44. Unico Floor Machine does all jobs in less time, with less labor, at lower cost, features 90° adjustable handle, 4" rubber cushion wheels, 175 rpm brush speed, etc. Leaflet describes this machine and accessories. United Floor Machine Co., 7600 S. Greenwood Ave., Chicago 19, Ill.

45. Electric Timing Motors, including new series for very slow output speeds in a minimum of space, are discussed with

photographs, dimensional drawings, and other pertinent data. Send for 8-page, 2-color catalog No. 322. E. B. Hamlin, Advertising Mgr., Haydon Mfg. Co., Inc., Torrington, Conn.

46. Differential Pressure Transformer, for measuring differential pressures for indicating, recording and controlling the rate of flow of steam, gas or liquid fuel, water, is described in bulletin 2250. Pilot valve enables the transformer to respond instantly and accurately to changes. Hagan Corp., 323 4th Ave., Pittsburgh, Pa.

47. Q-C Airmotor for application on Q-C

*yours for the Asking*

11 NEW CATALOG BULLETINS  
and PRICE LISTS



SCULLY-JONES  
PRODUCTION TOOLS

### Bring your catalog files UP-TO-DATE

These New Catalog Bulletins replace Scully-Jones Tool Engineering Manual 500 and any other S-J literature previously published on the tools shown.

Catalog Bulletins listed below are complete with Price Sheets and show information on 57 S-J Standard Production Tools. Write for your copies. There is no obligation.

#### No. TOOLS SHOWN

- 1-50 Drill and Tap Chucks
- 2-50 Arbors and Adapters
- 3-50 Quick Change Chucks
- 4-50 Tap Holders and Drivers
- 5-50 Counterborers, Countersinks and Core Drills
- 6-50 Adjustable Adapters and Spindle Extension Assemblies
- 7-50 Sleeves, Sockets and Turret Tool Holders
- 8-50 Floating Holders
- 9-50 Centers
- 10-50 Recessing Tools
- 11-50 Work Rest Blades

#### CUT PRODUCTION COSTS

Let us help you solve your tooling and production problems. For quick service see our nearest representative or contact us direct.

**Scully-Jones**  
AND COMPANY

YOU GET LOW COST, FAST, ACCURATE PRODUCTION WITH OUR STANDARD AND SPECIAL TOOLS

jigs and fixtures converts them to air operation in less than 10 minutes. Descriptive bulletin available from **Q-C Engineering Products, 2842 W. Grand Blvd., Detroit 2, Mich.**

48. "Tenite Extrusion", 28-page book, gives information on equipment and choice and handling of material for extrusion of Tenite I, cellulose acetate plastic, and Tenite II, cellulose acetate butyrate plastic, also sections on tubing and sheeting. **Tennessee Eastman Corp., Kingsport, Tenn.**

49. "Drill Presses As Threaders", 4-page

bulletin, describes the H & G die heads applicable to drill presses including table of dimensions and capacities. Solid adjustable heads for tapping machines are also discussed. **The Eastern Machine Screw Corp., Truman & Barclay Sts., New Haven 6, Conn.**

50. **Dihedral Couplings** handle maximum misalignment up to 7 degrees with minimum clearance or backlash. Complete data given in bulletin 50. **Ajax Flexible Coupling Co., Inc., Westfield, N. Y.**

51. **Toolmakers' Microscope** for precision shop measurements is introduced in 8-

page bulletin 147-50. Thirty features are itemized and dozens of applications are indicated. Specifications also given. **The Gaertner Scientific Corp., 1201 Wrightwood Ave., Chicago 14, Ill.**

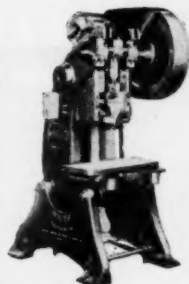
**52. Standard Tube Fittings**, flare and no-flare types for industrial use, are described in catalog No. 500. Alloy steel spring sleeve which holds tube securely with increased holding power is featured. Complete engineering specifications given. **Flodar Corp., 331 Frankfort Ave., Cleveland 13, O.**

**53. Go-Getter**, power liftruck, high and low lift, fork, pallet, and platform types, is introduced in Bulletin 166. Exclusive feature is the concentration of all controls at the end of the handle. **Revolva-tor Co., Tonnele Ave. at 86th St., N. Bergen, N. J.**

### Manufacturing Processes—Production

By S. E. Rusinoff, M. E. Associate Prof. of Mechanical Engineering and Manufacturing Processes, Ill. Institute of Technology. Published by American Technical Society, Chicago, 1949. 500 pages.

In this volume, the author has effectively presented the machine tools, jigs and fixtures, quality control through statisti-



### DEEP THROAT LARGE BOLSTER AREA

An Ideal Press  
for  
Trying Out Dies

The Walsh No. 38X Deep Throat 38  
Ton Inclinable Power Press.

Other Walsh Presses Available from  
6 to 65 tons.

Write Dept. "A" for Catalogs  
Fully Describing All Presses.

**SCHULTZ & ANDERSON CO.**

111 EDISON PLACE  
NEWARK 5, N. J.

## Nicholson W.O. Traps STOP COSTLY AIR LOSS these 3 ways

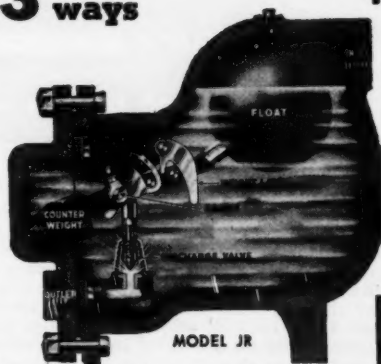
With air the most expensive pressure medium today, these 3 leak-proofing features of Nicholson air traps are proving important cost-cutters:

- 1) No air-wasting vent, such as is in all inverted bucket traps.
- 2) Positive water-seal at valve.
- 3) Large orifice keeps valve clean, preventing blow-through.

Three types; pressures to 1500 lbs.  
CATALOG 250

**W. H. NICHOLSON & CO.**  
117 OREGON ST., WILKES-BARRE, PA.

Steam & Air Traps - Control Valves - Expanding Mandrels - Arbor Presses - Welded Floats



**"a chain is only as strong..."**



**SAVE PRESS DOWN TIME WITH**  
**pivot®** the world's most  
**dependable punches**

- STRAIGHTGROUND
- WHIPSLEEVE SUPPORTED
- HIGH SPEED STEEL

U.S. AND FOREIGN PATENTS

**FREE Catalog and Price List. Write for your copy**

**PIONEERS IN HIGH SPEED STEEL PUNCHES**  
**pivot punch and die corporation**  
173 OLD NIAGARA FALLS BLVD. NORTH TONAWANDA, N. Y.

cal methods, and safety programs so important to modern industry. Numerous factors involved in the selection and use of this equipment are thoroughly explained, and special emphasis is given to the use of automatic machines. One chapter dealing with the selection of speeds and feeds as well as the use of jigs and fixtures should prove of practical value.

This book also gives a complete analytical discussion of cutting forces, power, tool life, chip formation, cutting fluids, and tool shape. To permit the selection or integration of the book to meet some study requirement, each subject is treated

as a separate unit. For additional information, an extensive bibliography is provided at the end of each chapter. The outstanding features are the sections which survey the fields of precision inspection and quality control.

Although this volume was primarily intended for the undergraduate and the graduate student interested in product design, it is written in such a way that a nonacademic person would be able to understand its contents.

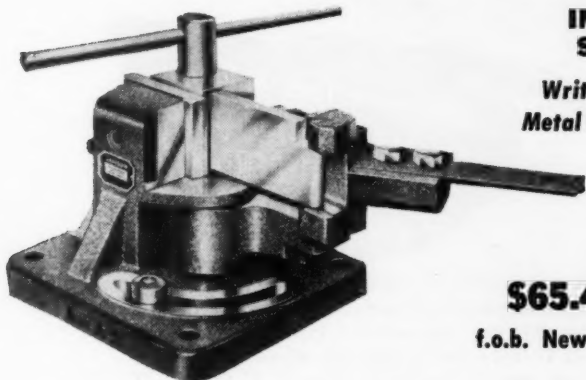
#### **Manufacturing Processes—Materials**

*By S. E. Rusinoff, M. E. Associate Prof. of*



# New SAMSON ANGLE BENDER

with quick-grip clamping device  
Hardened steel replaceable jaws • Stop gauge for  
setting angles • Quick adjustment for thickness • Fast  
Accurate • Easy to operate



**IMMEDIATE  
SHIPMENT**

Write for catalog of  
Metal Working Equipment

**\$65.40**

f.o.b. New York

## Capacity

**3" x  $\frac{3}{16}$ " flats  
1/2" squares**

**1/2" rounds  
2 1/2" x 2 1/2" x 1/4" angles**

## JULIUS BLUM & COMPANY, Inc.

Established 1910

532 West 22nd Street, New York 11 • Phone WAtkins 9-7042

*Mechanical Engineering and Manufacturing Processes, Ill. Institute of Technology Published by American Technical Society, Chicago 1949. 393 pages.*

This volume is an invaluable reference to the progressive shop foreman, plant supervisor and executive. Its contents reveal that special consideration has been given to the needs of the engineer and designer.

Mr. Rusinoff designed the volume primarily to acquaint the student with the important manufacturing processes, materials, and the extensive equipment required for processing these materials.

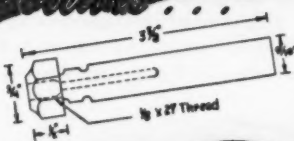
Casting, hot and cold forming of metals, welding, heat treatment, powder metallurgy, and plastics are described thoroughly. For a more extensive study on the various subjects, bibliographies are given at the end of each chapter. Abundant illustrations of the equipment used are also included in this volume.

## Power Capacitors

*By Ralph E. Marbury. Published by McGraw-Hill Book Company, Inc., New York, N. Y. 205 pages. \$3.50*

This volume is one of the first in the "Westinghouse-McGraw-Hill Engineering

## How to trade Pennies for Dollars . . .



**10c more (per gallon)  
invested in cutting fluids  
SAVES \$50 PER DAY  
PER MACHINE!**

PRICE alone makes no profit. The drawing above illustrates a shackle bolt which is drilled and tapped on a New Britain Automatic. Using an inferior cutting oil 12 taps were used up every 2½ days—12 pieces per tap. A change to Stuart's SPEEDKUT M on a 2½ day run showed 530 pieces per tap—no taps used up. The saving? Taking into full account the pennies—higher price of Stuart *quality* oil: \$50 per day per machine!

If you are interested in a saving like this, ask to have a Stuart representative call. There is no obligation—we'll let Stuart performance do the selling.

**D. A. Stuart Oil Co.**

2749 S. Troy Street, Chicago 23, Illinois

Books for Industry" series. The author, nationally known authority on capacitors, is Manager of the Capacitor Section at Westinghouse and has worked on the development and design of rectifiers, air conditioning, electrostatic precipitators, lightning arresters, etc.

It opens with a brief explanation of the materials and characteristics of capacitors, their ratings, design and manufacture. Its ten generously illustrated chapters give a complete and thorough discussion of the methods used to determine the proper selection of capacitors for a given condition.

### Metallurgy and Magnetism

By James K. Stanley. Published by American Society for Metals, Cleveland, Ohio. 150 pages. \$4.00

The factors affecting magnetic quality are treated systematically in this volume. It can be used as an introductory text on ferro magnetism and types of magnetic materials.

The headings of the four profusely illustrated chapters are: I. Magnetic Theory and Definitions; II. Types of Magnetic



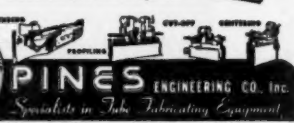
#### COST CUTTING FEATURES OF PINES BENDERS

- Produces Accurate Uniform Bends without marking or distorting.
- Push-Button Control—simple, easy for one man to operate.
- Highly Versatile—handles wide variety of work—serpentine, coil, compound or multiple bends.
- Fast Set-Ups—tool changes in 10 minutes.
- Superior Design—tapered alloy-steel spindle, adjustable gibs, Timken bearings, Vickers pump

THE Pines principle of bending piping, tubing, extruded or rolled sections and mouldings, employs tested and proven methods that assure best results and peak production. Roll, compression, draw, and stretch bending methods are skillfully adapted to best suit your material and product needs. Hydraulic power, push-button control and automatic operation is combined to assure high efficiency and lower production costs. Ask Pines to analyze your bending problems now. Phone Aurora 2-7608.

#### WRITE FOR FREE LITERATURE

Find out how the Pines Benders are designed to save time and cut costs. Literature describes and pictures various models, attachments, and methods on actual jobs.



**PINES ENGINEERING CO. INC.**  
Specialists in Tube Bending Equipment  
882 WALNUT AURORA, ILLINOIS

Materials-Soft Magnetic Materials and Permanent Magnets; III. Factors Affecting Properties-Product Factors and Chemical and Structural Factors; IV. Magnetic Analysis-A Metallurgical Tool.

The author, a research metallurgist at Westinghouse, has been associated with Dr. T. D. Yensen, a pioneer in the study of magnetic alloys. Together with Dr. Yensen, he developed the iron-cobalt known as Hiperco.

#### Elementary and Applied Welding

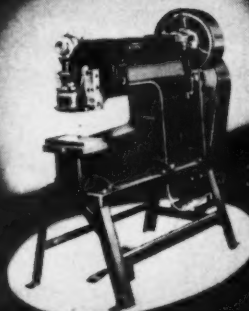
By Herbert P. Rigsby and Chris Harold Groneman. Published by The Bruce Publishing Company, Milwaukee. 151 pages. \$2.00

ing Company, Milwaukee. 151 pages. \$2.00

This book, containing material on oxyacetylene and arc welding, would be especially helpful to the beginning student in this field. The informational material is restricted to industrial opportunities, commercial methods, tools and equipment, metals, and safety practices. Some of the subjects discussed are: cutting metal by the oxyacetylene process, arc welding on flat metal, and types of joints and their preparation.

In the second part of the book, projects or problems are illustrated and basic pro-

**WHITNEY METAL**  
**TOOL COMPANY**  
**41 YEARS EXPERIENCE**



**WHITNEY-JENSEN**  
**No. 230 - No. 231 DEEP THROAT**  
**POWER PUNCH PRESSES**

These sturdy, deep-throated presses are widely acclaimed for their high speed and accurate production. Frames are welded steel; auxiliary attachments available; various punches and dies in stock for these two outstanding models.

Capacity: 20 tons  
Throat Depths: 18" and 24"

**WHITNEY METAL TOOL COMPANY**  
**115 FORBES STREET, ROCKFORD, ILLINOIS**

cedures are given so the learner may be guided methodically from the most simple to the more complicated processes involved in the projects. The projects include various articles which can be used in the home, the yard, the school or home workshop.

**Metal Finishing**

*By L. H. Langdon and Staff. Published by Finishing Publications Inc., 11 West 42nd St., New York 18, N. Y. 488 pages. \$2.50*

The 19th Annual Edition of the guide-book-directory for the metal finishing

industry is devoted exclusively to metallic coatings. New data is included on corrosion proofing plating equipment, control of the increasingly more expensive water required, and the adequate disposal of toxic wastes.

Authoritative articles dealing with automatic polishing and buffing machines, steel burnishing, and periodic reverse plating are discussed. Recently developed testing techniques have been added to make the chemical analytical section up-to-date. In the directory section you'll find a complete list of plating and finishing manufacturers and suppliers.



the  
TOUGHEST  
jobs  
can't shatter  
**STAR**  
Molyflex  
Blades

Star Molyflex Blades eliminate the biggest fault of high speed hack saw blades. *They're completely shatterproof and unbreakable in a frame.* That's true no matter how tough the job may be.

And Molyflex leads the field in cut-ability. Tests prove that Molyflex Blades cut 23.8% better than the average of 8 leading brands of high speed flexible blades.



Your Star Supplier stocks the complete Star line of hand and power hack saw blades, frames and bands.

He also has the handy Star Wall Chart and the useful 32-page booklet, "Metal Cutting". Both are packed with valuable information on blades and cutting techniques. Get your copies today. They're FREE.



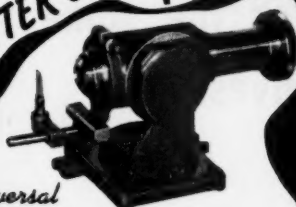
**CLEMSON**  
BROS., INC. • Middletown, N.Y., U.S.A.  
Makers of hand and power hack saw blades, frames, metal cutting band saw blades and Clemson Lawn Machines

## NOW! A LOW-COST CUTTER GRINDING FIXTURE

The

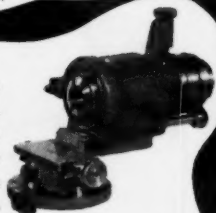
*Universal*

CUTTER GRINDING FIXTURE fits any universal tool or surface grinder. The basic unit, shown here (standard accessories not shown), with its four attachments, below, provide a quick and accurate answer to nearly all cutter and tool grinding demands.



Precision  
BALL END MILL  
grinding is done with

this compact, easily-operated fixture. An exceptionally flexible instrument, it grinds up to 2 1/4" dia., sets at any angles or radius with any cutting clearance on square, conical or ball nose shaped end mills.



▶ The MULTI-SWIVEL VISE attachment employs three swivels for quick set-up of any compound angle.



▶ This versatile INDEXING LOCK BRACKET may be set up in any position at either end of spindle housing on basic unit.



▶ For precision GRINDING WHEEL DRESSING this attachment will handle any two angles as well as set radius.

Send for descriptive literature.

Several good territories in U. S. and Canada are open to qualified representatives. Write:

**ROCHELEAU  
TOOL AND DIE CO.**

650A No. Main St.

Leominster, Mass.

**3 times the  
productive capacity  
for the same tool  
investment**



*Write for*  
**CATALOG**

**SHELDON**  
**CHICAGO**

Old timers still tend to gauge a machine tool's productive capacity by its size and mass, and its accuracy by its cost. These old "rules" do not apply today, in the face of advanced machine tool engineering and modern machine tool building methods. For example, a modern TSS6B Sheldon Precision Lathe, weighing around 1000 lbs., will handle the great bulk of production lathe work, and it has "Zero Precision" Timken Taper Roller Bearings—more accurate spindle bearings than found in 90% of the lathes of all sizes.

By scientific distribution of metal (rather than sheer mass) these new machine tools have rigidity and stamina not always obtained in more cumbersome machine tools. Lighter, handier and easier to run, they can be safely operated by the less experienced—by whatever operators available.

Produced in numbers, in a specially built and tooled plant, Sheldon Precision Machine Tools are low in price. Today for the cost of a single older type tool you can have 2, 3 or even 4 SHELDON units . . . can put 2, 3 or 4 operators to work . . . can double or triple your productive capacity for the same machine tool investment.

*Let us show you how.*

**SHELDON MACHINE CO., INC., 4242 N. Knox Avenue, Chicago 41, Illinois**





# MTBB

FEBRUARY, 1951

## What's New in Metalworking

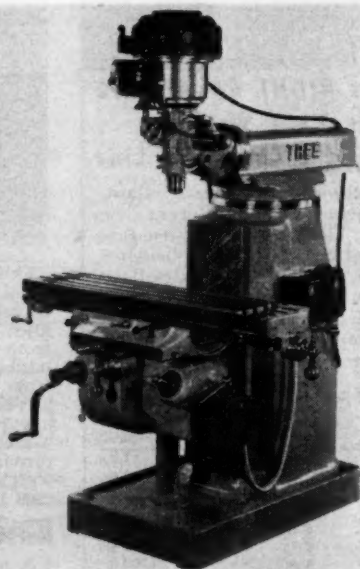
### TREE UNIVERSAL VERTICAL MILLING MACHINE

The Tree Tool and Die Works, 1600 Junction Ave., Racine, Wisconsin, is introducing its new Model 2 UV Universal Vertical Milling Machine. This unit features unusual range and versatility of its 45° dovetail column and extended knee construction. It is stated to have the rigidity, weight and range of a No. 2 size milling machine, as well as a universal vertical head for all angle milling, drilling and boring.

The vertical head moves up to and including 45° across the table each way from a vertical position (see smaller illustration). This permits angular milling cuts from the length of the longitudinal table feed without resetting. The head can also be rotated in a plane parallel with the table axis 90° each way. A 1 h.p. axial air-gap motor is provided to power the spindle at speeds ranging from 140 to 3500 r.p.m. The capacity of the head ranges from 1/8" to 1 1/2" end mills.

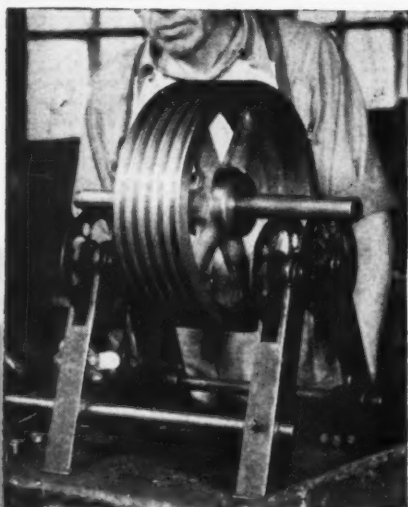
The head is mounted on a dovetail type ram which enables moving the spindle to any position perpendicular to the table without the necessity of realigning after moving. All adjustments to the ram and head are controlled by rack and pinion to provide ease and safety of movement.

The spindle is mounted in sealed-pre-loaded ball bearings. The quill and spindle are hardened and ground for long life and dependable operation. The



spindle is of sufficient size to provide rigidity and to maintain alignment under rugged operation. A counterbalance makes either hand or power operation of the quill supersensitive throughout the 4" travel.

The automatic collet closing mechanism for holding tools and cutter (the same as now applied to the Tree Universal Milling Attachment) permits quick and effortless tool changing and setup. The power obtained by this mechanical device assures tool holding without slippage. Other fea-



## There's a **RIGHT BALANCING TOOL** for Your Work in Sundstrand's Complete Line

Our complete line of sensitive balancing tools includes eight different sizes and types. They are widely used on automobile tires, cotton gin brushes, crankshafts, flywheels, cones, pulleys, polishing wheels and other products. You'll find the balancing tool best suited to *your* work in this line of eight different sizes and types.

### CAPACITIES

Swing	Between Standards	Weight Capacity
21 in.	20 in.	12 lbs.
21 in.	20 in.	800 lbs.
43 in.	29 in.	800 lbs.
43 in.	29 in.	2,000 lbs.
6 ft.	5 ft.	5,000 lbs.
8 ft.	8 ft.	10,000 lbs.
Any	Any	24,000 lbs.
43 in.	30 in.	800 lbs.

### FREE DATA



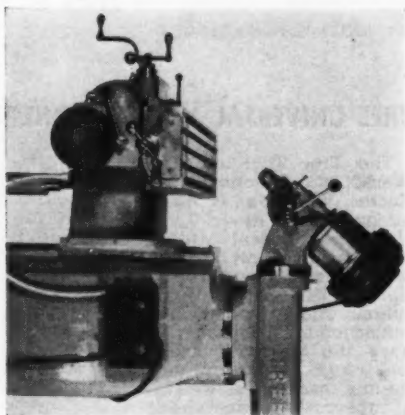
You can obtain complete information on Sundstrand Balancing Tools by writing for bulletin No. 404.



**Sundstrand Machine Tool Co.**  
2535 Eleventh St., Rockford, Ill., U.S.A.

tures of the head include powered down feed to the quill, enclosed micrometer depth stop, and positive quill lock.

The 2 UV Milling Machine contains a built-in feed box providing five rates of feed and rapid traverse to the longitudinal table movement. The feeds are  $\frac{1}{4}$ ,  $1\frac{1}{2}$ ,  $2\frac{3}{4}$ , 4 and 7 inches per minute, and the rapid traverse is 70" per minute. The feed drive to the table is through a safety device which prevents damage to the screw or gearing when an obstruction is encountered.



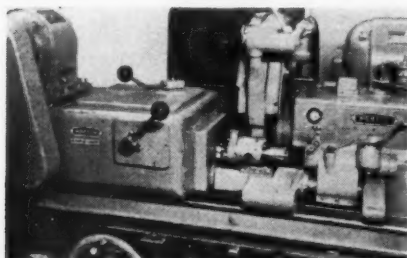
Other specifications include a longitudinal table travel of 25"; the transverse travel of the saddle is 10"; the vertical knee travel is  $17\frac{1}{2}$ ". Maximum distance from the spindle to the table is  $20\frac{1}{2}$ ". minimum, 0. The maximum distance from spindle to column is 22", minimum, 0. The table working surface dimensions are  $10\frac{1}{2}$ "x42"; it is provided with three T-slots, 11/16" wide. Pressure oiling is provided to saddle, table and screw. The weight of the machine is approximately 2500 lbs.

### Norton Piston Grinder

A new unit for grinding automotive or other types of pistons where a taper to the conventional relief form is required is announced by Norton Company, New Bond St., Worcester 6, Mass., manufacturers of grinding machinery and abrasive products.

The Norton unit grinds the desired shape by holding the piston between centers, with the head end of the piston being carried in a dog or holder, and centered on the master cam spindle center. The bottom end of the piston is

supported on a special foot-stock center carrying a spherical ball bearing. The foot-stock in which this special center seats does not rock, by reason of being mounted on the rocking bar as in normal cam or shape grinding practice. It is mounted on a stationary member of the machine.



The motion and corresponding amount of piston relief that is ground at any point between these centers is proportional to the distance from the foot-stock pivot. Thus a greater amount of relief is ground at the head of the piston than at the bottom of its skirt, which is nearer the pivot.

The spherical ball bearing on the foot-stock center becomes a pivot about which the piston revolves and oscillates according to the motion of the rocking bar as imparted by the master cam. In-and-out motion at the foot-stock pivot is zero, since this is a stationary point.

### Load-Mobile Electric Lift Truck

The Marforge Load-Mobile has recently undergone improvements that make it a more efficient, economical piece of equipment, according to its manufacturer, the Market Forge Co., 25 Garvey St., Everett, Mass. The Electric Lift Truck has found outstanding success in a wide variety of industrial plants.

The basic design of the Load-Mobile—including the 3-way operating positions—remains the same. The important improvements include:

1. A 'high-low' switch is now provided for easier maneuverability in close quarters. When the button is at 'low', the truck moves at slow speed regardless of the position of the operating pedal. When the button is at 'high' the operator controls the speed—either high or low—by means of the foot pedal.

2. Spring-mounted casters have been added to increase stability (especially in

## SawMore

METAL CUTTING MACHINES

If it's speed you need . . . SawMore Metal Cutting Machines are your first choice. SawMore Machines cut accurately. Operate at lowest cost.

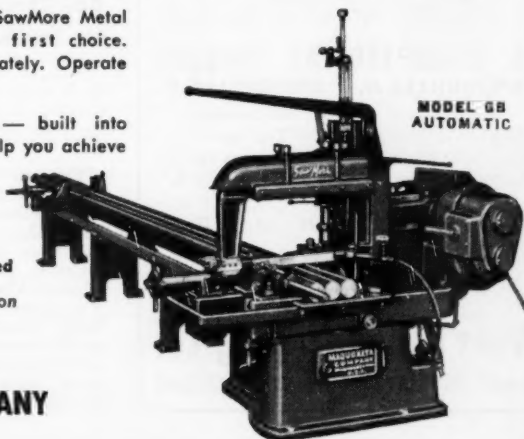
These highlight features — built into every SawMore Machine— help you achieve top production.

- Self-aligning blades
- Automatic feed
- Gears—constant mesh
- Positive compensating feed

Write for complete information  
on the advantages of  
SawMore Machines

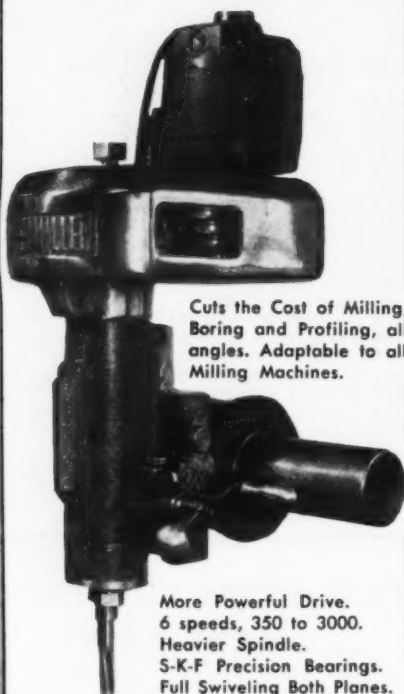
**MAQUOKETA COMPANY**  
CLINTON, IOWA

## FAST METAL CUTTING ... MADE EASY!



# SPEEDMILLER

## Universal Milling Heads



Cuts the Cost of Milling,  
Boring and Profiling, all  
angles. Adaptable to all  
Milling Machines.

More Powerful Drive.  
6 speeds, 350 to 3000.  
Heavier Spindle.  
S-K-F Precision Bearings.  
Full Swiveling Both Planes.

### 2 EXCEPTIONAL VALUES

#### SPEEDMILLER Jr.

for overarms  
2 1/4" to 3 1/2".  
No. 7 B & S Spindle.  
Collet Capacity 1/2".

#### SPEEDMILLER Sr.

for Overarms  
3 1/4" to 5".  
No. 3 Morse Spindle  
Collet Capacity 3/4".

Parts and Collets for all HALCO Heads

*Quick Delivery—Order NOW!*

## Veet Manufacturing Co.

EAST DETROIT

MICHIGAN

narrow models). These casters normally clear the floor but when the truck tilts (as in making a sharp curve, etc.) the heavy springs right it promptly. This new feature allows the truck to pass over obstructions, inclines, etc., without difficulty.



3. Freer use of sealed ball-bearings in the control system means that just a light touch on the foot pedal is all that is needed to put it in required position.

4. A heavy roller chain operates the brake instead of an enclosed cable.

5. The hydraulic lifting mechanism is arranged in a vertical position at the front end of the hood where it is less likely to be damaged in transit over rough floors.

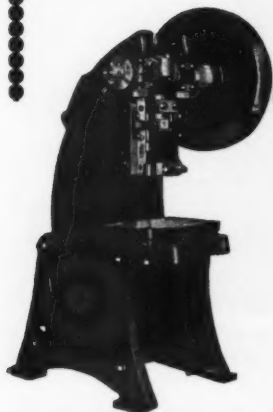
### Ace Abrasive Diamond Wheels for Internal Grinding

A new type of diamond wheel which it is claimed has longer life and faster cutting qualities is now being produced by Ace Abrasive Laboratories, 250 West 57th St., New York, N. Y.

The company, after years of research, has developed Dura-Bond, a new bond that contains the uniformly-graded "Star-Dust" diamond powders in richer mixtures than was ever before thought possible. Benjamin Greenfield, president of Ace Abrasive Laboratories, states that a number of impartially conducted tests have proven the longer life and high performance of these diamond wheels which are now available in the unusually small sizes of .046" and .090", as well as in sizes ranging up to 2" diameter.

# BUY MARSHALLTOWN

## LONG LIFE FOR DEPENDABILITY PERFORMANCE



They are engineered and built to give you the most for your money. They incorporate many outstanding advantages and features of design; include more die space—chrome molybdenum cranks, wrist pin connections.

*Write today for literature.*

**MARSHALLTOWN MFG. CO.**  
900 E. Nevada Street  
MARSHALLTOWN, IOWA

## The internal gage that's RIGHT for war production conditions COMTORPLUG

Gages precision bores to fractions of .0001"

War production conditions intensify the need for a gage that gives high precision yet is Rugged, Automatically Accurate, "Unrestricted". Patented COMTORPLUG answers the need as no other gage can because:

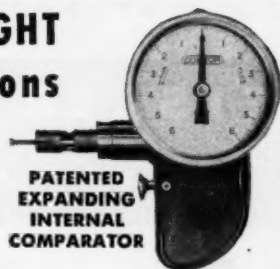
- 1) Withstands typical shop use at machine or inspection bench, without lessening precision.
- 2) Trainees equal old hands in precision results, due to automatic alignment and "feel".
- 3) For Quality Control, gives actual measurement, and a fixed-not passing—reading.
- 4) Available anywhere instantly. Weighs but a few ounces. No hose, wire, or "10-ton base".
- 5) Cost is so reasonable as to be practical for all quantity gaging applications. Fits in with other gaging methods. Let it grow as it proves itself—which it WILL!

**COMTOR CO.** Request  
"Bulletin  
40"

62 Farwell St., Waltham 64, Mass.

For data on COMTORGAGE Precision External Gage, request Bulletin 30.

February, 1951



**PATENTED  
EXPANDING  
INTERNAL  
COMPARATOR**

$\frac{1}{8}$ " to 2" dia.

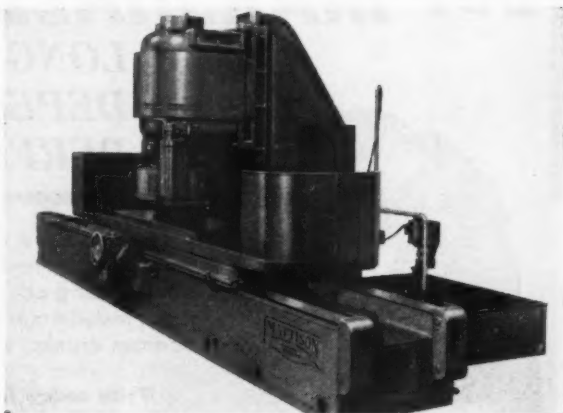


Inspection to fractional ten-thousandths of hydramatic airplane propeller distributor valve.



## Mattison Vertical Spindle Surface Grinder

The picture at the right shows a No. 400S Vertical Spindle Surface Grinder equipped with a 100 h.p. motor, a recent unit announced by Mattison Machine Works, Rockford, Ill. According to the manufacturer, this motor is the largest ever to be used in connection with a grinder of this type. This particular machine was recently completed by Mattison, and is now in operation in an automotive plant reconditioning large size dies. The 100 h.p. motor provides for quick stock removal, while the heavy, rigid construction of the machine assures more accurate results, according to Mattison.



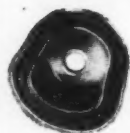
The standard No. 400 Mattison Vertical Spindle Surface Grinder is available in seven different table lengths—50", 62", 86", 102", 120", 132" and 190". The width of the table is 18" on all lengths. A choice of either a 22" x 5" x 2" face nut inserted

type cylinder grinding wheel or a 22" x 6" x 2" face segmental type grinding wheel, is offered.

The standard grinding wheel spindle motor is a 40 h.p., 60 cycle, with a speed of 700 r.p.m. The maximum clearances be-

## EISLER CAM

### JIG BORING • MILLING



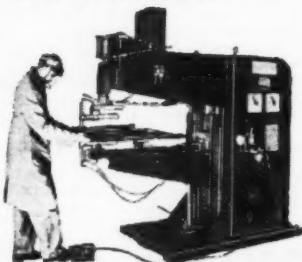
A SPECIALIZED  
ROWBOTTOM CAM  
MILLING SERVICE...  
JIG BORING... SPOT  
WELDING... CON-  
TRACT PRODUCTION  
... EXPERIMENTAL  
DEVELOPMENT



\* Consultation without any obligation  
on your part is cordially invited

## RESISTANCE WELDERS SPOT • BUTT • GUN • SEAM

For all types of welding in  
sizes: 1/4 to 300 KVA. Foot,  
air or motor operated.



We invite contract spot  
or butt welding  
in large or small quantities.

EISLER ENGINEERING CO., INC.  
762 South 13th St., (Near Avon Ave.)

Chas. Eisler, Pres.  
Newark 3, N. J.

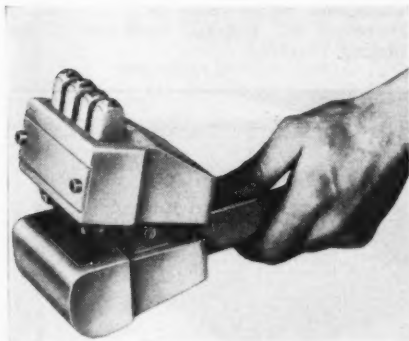


tween the wheel and the table are 19" and 18", respectively. The hydraulic pump motor is 7½ to 15 h.p., depending upon the table length. The power for raising and lowering the wheel head is furnished by a 2 h.p., 60 cycle, 900 r.p.m. motor. The coolant pump is driven by a ¾ h.p., 60 cycle motor. The required floor space is 9' x 16' for the 50" and up to 9' x 38' for the 190" table model.

The manufacturers state that the standard model No. 400 is recommended for surface grinding of engine blocks where the stock removal is large. The machine is stated to produce polished die surfaces to the closest tolerances.

### Steel Sheet Marking Device

A new marking device for stamping steel sheet, strip and other flat thin metals has been announced by M. E. Cunningham Co., 228 E. Carson St., Pittsburgh 19, Pa. Made from aluminum for lightness in weight and ease in handling, the new Model JG-1 stamping tool can also be manufactured with a holder section for accommodating almost any size or number of characters.



By finger pressure, the top swivels upward so that the holder can be slipped over the pieces to be marked. When the pressure is released, springs drop the top into position for marking. To complete the marking operation, each stamp is struck individually with a lightweight hammer.

Specially designed springs retain the stamps in the holder and also permit rapid changing of stamps. The bottom of the holder includes a piece of steel around which the aluminum is cast. This serves as an anvil, thereby holding distortion of the metal to a minimum.

**HOLD THE  
TRUCK!**

**I JUST FINISHED  
THE HARDNESS TEST  
ON THE LAST  
BUSHING IN THIS  
SHIPMENT**



**EACH AND EVERY  
UNIVERSAL  
DRILL BUSHING  
IS TESTED FOR HARDNESS  
which assures longer  
bushing life**

**UNIVERSAL 147-2  
ENGINEERING COMPANY  
FRANKENMUTH 10, MICHIGAN**

### Federal Sheet Stock Thickness Gage

The new Model 644 Portable Thickness Gage has just been announced by Federal Products Corp., 1144 Eddy St., Providence 1, R. I. This useful device is recommended for the rapid checking of sheet and strip stock. Its functions include checking incoming material to insure the receipt of the proper stock sizes; assuring issuance of the correct sheet thickness from the stock room to the production department, for stamping, blanking, drawing and forming; measuring stock before and after plating operations in order to determine the thickness of plating.

The measurement is quickly and accurately transferred to the Model G81 full-jeweled dial indicator, graduated in .001", through the hardened steel upper and lower contact points. The wide-faced spring-loaded upper and lower anvils grip and hold the gage perpendicular to the stock surface.

The portable thickness gage is designed with a retraction lever built into the handle in normal gripping position. The protecting lip at the front scoops and guides the stock into the gage. Chamfers on the anvil further facilitate entry of the stock.

The indicator may be furnished with a direct or continuous-reading dial, depending upon the use of the gage. For sorting purposes, a direct-reading dial is preferred. When checking the thickness



of plating, a balanced dial is recommended as more practical, since it shows variations either side of zero which represent the nominal thickness of the plating required.

**Leaders over 50 years**  
*Established 1899*

**TOOL  
CRIBS and  
PARTITIONS**

**Standard Sections Woven Wire Mesh Panels and  
Doors to enclose Tool Cribbs, Stock rooms and other  
enclosures.**

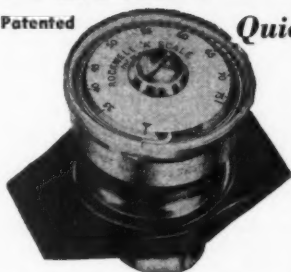
**IMMEDIATE DELIVERY**      **Write for Catalog**

**Acme Wire & Iron Works**  
3519 E. CANFIELD — DETROIT 7, MICH.

# The **ERNST** Portable **HARDNESS** TESTER

Patented

*Quick . . . Accurate, Direct Readings.*



- |                                 |  |
|---------------------------------|--|
| 1. <b>Size and Portability.</b> | Overall size, Height 3", Diameter 2 1/2". Packed in case 6" x 3 3/4" x 3 1/2". Weight net 30 oz. |
| 2. <b>Accuracy.</b>             | Each Instrument individually calibrated.   |
| 3. <b>Operation.</b>            | By Hand Pressure.  |
| 4. <b>Indentation.</b>          | Maximum depth 0.003", Maximum diameter 0.006".   |

5. **Scale.** Direct readings of hardness on visible scale to either Rockwell or Brinell — low, medium or high ranges.
6. **Penetration.** "Static" and not determined by "Shock" application.

Instrument is designed to meet long demand for reasonable priced, portable, accurate product giving direct readings without reference to conversion scales or calculations.

*Write for Prices and Bulletin ET*

**NEWAGE INTERNATIONAL, INC.**

521 Fifth Avenue

New York 17, N. Y.

Distributors Inquiries Invited. Offices in London, England and Toronto, Canada.

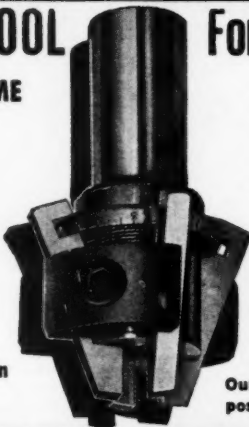
# **KUTMORE** ADJUSTABLE **HOLLOW MILLS**

**THE FINEST TOOL** For ***Production***

**CUTS PRODUCTION TIME**

- **TURNING**
- **TAPERING**
- **FACING**
- **CHAMFERING**
- **TREPPANNING**

Any combinations of above in  
**ONE PASS**



- **Exclusive Micrometer Adjustment Feature For Rapid Set-Up.**
- **Cutting Capacities From 1/32" to 2" Diameter In Standard Stock.**
- **Blades Quickly Resharp-ened In Complete Sets.**

**Write for Catalog No. 20BB**

**Our Engineering Dept. is at Your Disposal on Your Hollow Mill Problems.**

**CARL WIRTH & SON, INC.**

1625 CLINTON AVE. NO.  
ROCHESTER 5, N. Y.

*"Get them from Gillen"*



TAPER PINS  
MACHINE KEYS  
SPECIAL MACHINE PARTS  
WOODRUFF KEYS  
GROOVE PINS

Write for Catalog  
and Prices

*John Gillen Company*  
INC.  
2542 SOUTH 50th AVENUE • CICERO 50, ILLINOIS

USE THE RIGHT TOOL FOR THE JOB . . .



Ask your  
BILLINGS DISTRIBUTOR  
He'll tell you why!

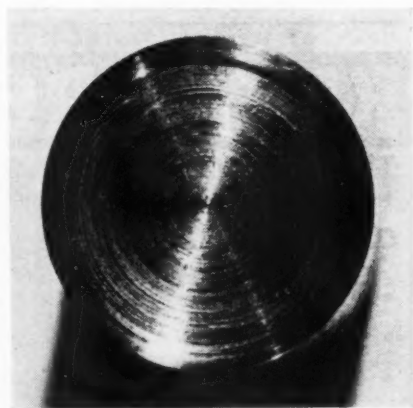
\*VITALLOY®  
SOCKET SETS & PARTS

THE BILLINGS & SPENCER CO. HARTFORD 1, CONN. U.S.A.

## Heavy Duty Hardening Compound

Wilcarbo Heavy Duty Pack Hardening Compound is a scientifically developed substance made by Wilson Carbon Co., Inc., 60 East 42nd St., New York 17, N. Y. According to its manufacturers, actual gradient hardening of steel machine parts can be achieved by the use of this compound. It can be used over and over again without waste, and is, therefore, economical to use. For constant production use, the material can be kept at efficient strength by the addition of fresh compounds. Wilcarbo contains all the metallic mineral and chemical elements that have made Hi-Speed-It another excellent hardening material for cutting and impact tools.

In use, the granular nature of Wilcarbo permits unscaled pieces and easily removed and re-used compound. Neither compound contains any toxic materials, or produces toxic gases, thus are safe to use. Case depth, thickness of increased tensile-strength area, and thickness of ductile core are determined by a choice of diffusing temperatures. Dense cases with maximum ductility in the body of the steel are obtained by diffusing the compound into the steel at 1550° F., heat treating at 1650° F. to quench.

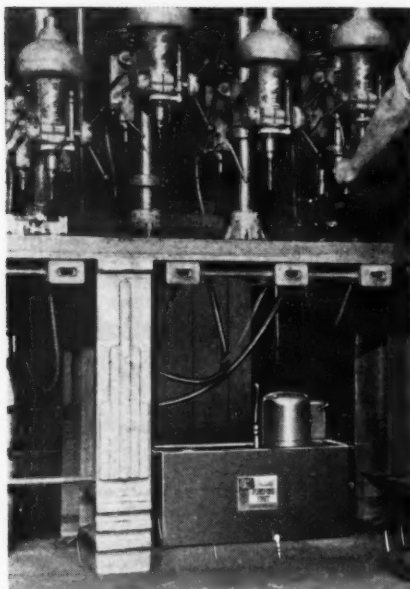


The above picture was obtained by anchoring an exposed cross section of the treated steel on a revolving machine base, after grinding it to a smooth polished surface. A diamond tool, under constant pressure, was set to start from the exact center, and cut outward—grooves similar to those on a phonograph

record. The picture shows the deep furrows outward from the core through the ductile area; then the grooves show much shallower penetration passing through the tough area, becoming shallower as it neared the case. Reaching there, the diamond stalled and dug the deep "trench," just inside the case. While not a true measure of the toughness and gradient of the penetration, this piece tested Rockwell C hardness of 32 at the core, then progressively 36, 42, 45, 56 and 62, and on the surface, 67.

#### Graymills Coolant Systems and Pumps

Production of a new line of coolant systems and pumps is announced by Graymills Corporation, Evanston, Ill. These self-contained gear or centrifugal type units are now supplied in 1/25, 1/12, 1/6, 1/4, and 1/2 horse power sizes.

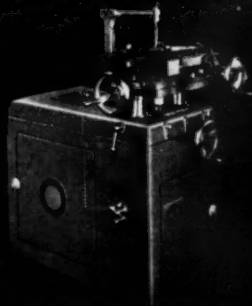


In from five to twenty minutes, a drill press, lathe, milling machine, grinder, or other machine tools can be converted for wet cutting by connecting a complete Graymills coolant system. These heavy duty units are recommended as replacements for many of the smaller coolant systems which are used on larger machine tools. Other uses for these units include circulating coolants through welding machines, as tap disintegrators,

# CUT

*Time and  
Costs*

## WITH THE ELECTRIX PRECISION DIE MILLER



The ELECTRIX PRECISION DIE MILLER is designed to mill inside and outside shapes such as blanking dies, draw dies and cams. Milling of complicated die and cam outlines is reduced to minutes with the ELECTRIX PRECISION DIE MILLER.

Actually see complicated outlines milled in MINUTES — NOT HOURS. Inverted infinite speed precision spindle sealed for life bearings — Counter balance fly wheel—assuring smoother finish and longer tool life.

For Particulars Write

### ROLL FEEDS CORP.

PAWTUCKET . . RHODE ISLAND  
Builders of "RFC" Roll Feeds

and for applying lubricants to stock on punch press operations.

The motors on the new heavier-duty Graymills have grease sealed ball-bearings and are totally enclosed.

### Flux Saves Silver Solder

AG Flux, recently introduced by Farrelloy Company, 1231 N. 26th St., Philadelphia 21, Pa. increases the bond of silver solder on stainless steel, monel, nickel, copper, brass, bronze and steel. The new AG Flux is a low temperature flux with a powerful scavenging action that acts on the silver solder to eliminate the time lag between fluidity of the solder and its adherence to the parent metal. It is claimed to increase the spreading action of the silver solder and increase the tinning coverage, saving precious silver.

By increasing fluidity of silver solder, the new flux reduces porosity to the vanishing point and thereby makes clean, nonporous brazed joints. It is further stated to reduce the mechanical skill required of the operator, as it withstands a wide range of heat. The joint therefore gives great strength with no sacrifice in ductility.

AG Flux is claimed to break the oxide on copper aluminum alloys—a new metal

with a great potential, not widely used, due to the difficulty of soldering. The flux actually disbursts the aluminum oxide leaving the silver solder uncontaminated with residual oxide. The flux resi-



due may be removed by washing with hot water. It may be thinned with water without reducing its effectiveness.

Acme Offers Complete Facilities for All Types of

## PRECISION GRINDING

FAST SERVICE... EXPERT WORKMANSHIP... LOW COST

- INTERNAL
- EXTERNAL
- CRUSH FORM
- CENTERLESS
- TWIN DISC
- SURFACE
- THREAD



Acme is equipped to handle all types of precision grinding. Expert craftsmen, using newest methods and modern equipment, will do the job for you faster, better, more economically. Acme also offers a flat lapping service that can finish surfaces to within millionths. Write for details.

## Acme Industrial Company

Makers of Standardized Jig & Fixture Bushings  
210 N. LAFLIN ST., CHICAGO 7, ILL.

THE SERVICE SHOP TO INDUSTRY FOR MORE THAN 25 YEARS



# HIGH SPEED PRODUCTION CONTINUOUS OIL GROOVING

WICACO CONTINUOUS OIL GROOVER cuts grooves of all descriptions, internal or external, continuous or intermittent.

Send us samples for grooving. We will return them cut to specifications, with a record of time and cost estimate. No obligation.

*Ask For Descriptive Booklet And See How  
You Can Improve Your Production.*

# WICACO

SINCE  
1868

MACHINE CORPORATION

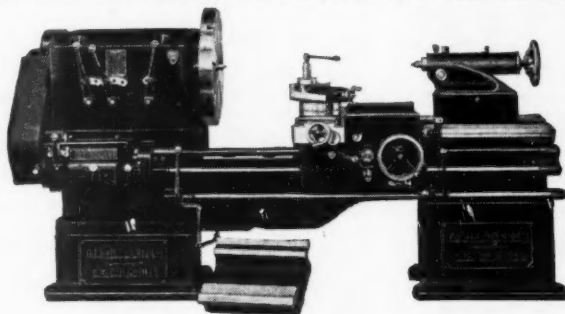
WAYNE JUNCTION, PHILA. 44, PA.

Manufacturers of  
Precision Machinery and Machine Parts  
Roller Bearing Twister Spindles—Spindle Oiling Machine  
Precision Internal Grinder—Screw Machine Products



# NEBEL Removable Block Gap Lathes

furnished in the  
Geared Head Motor Driven Type, 3 Step Cone Double Back Gear Belt Driven Type or with Motorized Headstock. Especially adapted for repair and maintenance as well as for general manufacturing. Handle a large variety of work with large swing through the gap.



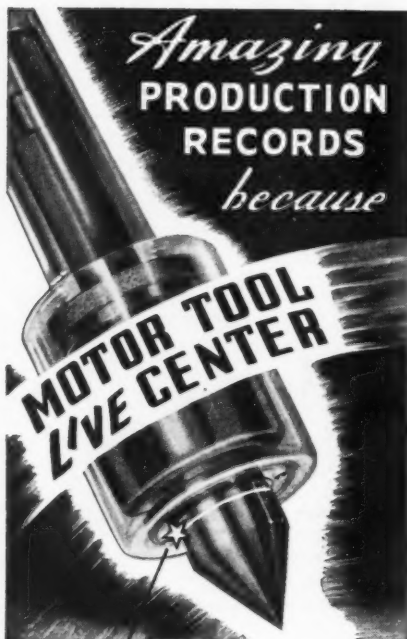
All Geared headstock type completely equipped with Timken Bearings, with motor mounted on rear of lathe. Quick change gear box, compound rest, steady rest, chasing dial, face plate, driver plate, wrenches, tool post and centers.

Furnished in four different sizes as follows:  
Series "L" 18/27"  
Series "A" 20/30"  
Series "B" 22/33", and  
Series "D" 28/40".

Write for Circular  
Giving Complete  
Information

# THE NEBEL MACHINE TOOL COMPANY

CINCINNATI 25, OHIO



is the **ONLY** Center  
with the  
**OVERLOAD  
INDICATOR**

Look for the **RED BAND**

You no longer have to guess whether you are overloading your live center thrust bearings if you use **MOTOR TOOL LIVE CENTERS**. When the load is too great the **RED BAND** around the spindle disappears into the housing. You can see at a glance when overloading occurs. This is an exclusive feature, developed by Motor Tool which cuts repair costs to practically nothing if due diligence is exercised. As long as the **RED BAND** is visible you are running **COOL** and **SAFE**.

Send for

NEW descriptive folder . . . and verified case histories of how **MOTOR TOOL LIVE CENTERS** have out-performed and outlasted ALL other centers on exceedingly tough, continuous-run jobs.

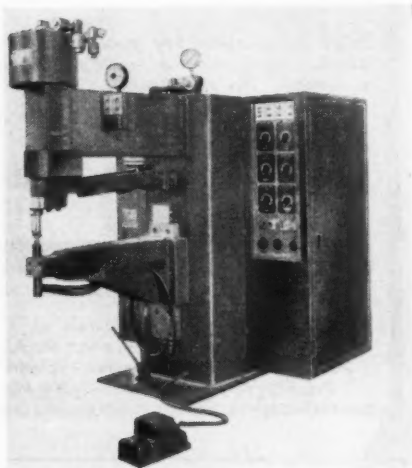
**MOTOR TOOL MFG. CO.**

P.O. BOX 3805 PARK GROVE STATION DETROIT 5, MICH.

Make it a Rule  
to Call Motor Tool

### Sciaky Resistance Spot Welder

A new resistance welder for spot welding aluminum, magnesium, stainless steel, Inconel, Monel, brass, mild steel and other alloys is introduced by Sciaky Bros., 4915 West 67th St., Chicago 38, Ill.



This welder is said to be unique in that the same machine can be quickly and easily adjusted to welding any one of the above-mentioned metals by change of control settings, and will handle various thicknesses of each. Previously, resistance spot welders have been much more limited in range of material and thickness that any one machine could handle.

The new Sciaky PMCO2ST "Three-Phase" Modu-Wave welder is designed for welding to Army and Navy specifications and will weld heavier thicknesses of aluminum, so that it is applicable to welding aircraft components including primary structural members. No changes in the machine are necessary to change from one thickness or one material to another. It is also adaptable to changes in product design or in production techniques. Welding speeds are said to be greater with this new welder and because it is a three-phase unit, it can be used where there are power limitations. The patented Sciaky Three-Phase System uses up to 75% less current than used by a single-phase welder and operates at approximately 85% power factor as compared to the 30% power factor of single-phase machines.

The new welder is a press type ma-

chine rated at 100 KVA at 50% duty cycle; it operates on 220 and 440 volt three phase, 60 cycle current. The standard throat depth is 36"; other depths are available. Welding range on low carbon steel is from .022" to .156" (two thicknesses) and on aluminum and magnesium alloys a range from .025" to .081". Ranges for other metals vary.

### Buckingham Thread Restorer

A thread restorer especially suited for reconditioning closely spaced studs and bolts that are battered, distorted or rusted, is introduced by Buckingham Manufacturing Co., Inc., Binghamton, N. Y. This device is added to a line of four other types of thread restorer tools, and completes a range of sizes which takes care of all ASME and SAE standard threads from 1/4" up to 4" diameter.

With a swing of only 2-5/16", this Buckingham thread restorer works readily in close quarters, particularly on cylinder heads of automotive, marine, diesel, and steam engines, also on wheel lugs, spring hangers, shafts, pipe—in fact, on almost every male thread, wherever its location, it is claimed.

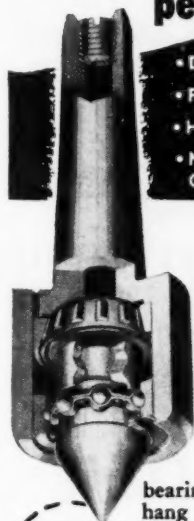
Adjustable cutting jaws can be fitted by a twist of the handle to any male thread of 1/4" to 1" root diameter, either right or left-hand. The jaws may be engaged at the bottom of the threaded section, and turned out toward the top,



leaving clean end threads, in which nuts may be started and run down easily.

The compactness of the unit makes it useful for carrying in tool kits. No die sets are required for interchange for size or type of thread. The tool is completely self-contained, and weighs only 1 1/4 lbs.

## SPEED-UP LATHE OUTPUT per Man-hour



- DEEPER CUTS
- FASTER SPEEDS
- HIGHER ACCURACY
- NO GOUGING OR BURNING

### IDEAL Live Centers

For Light or Heavy Turning

Run lathes faster with free-turning Ideal Live Centers. Eliminate lost time, spoilage and rework. No gouging or burning of Centers. Precision

bearings and short overhang provide long-lasting accuracy—greatest rigidity. All standard sizes. "Multi-Duty" models available with male, female and pipe points. "Heavy-Duty" models accurate to .0005"—for big jobs.

"TURNS  
WITH  
THE WORK"

Sold Through America's Leading Distributors

SEND FOR FREE INFORMATION

IDEAL INDUSTRIES, Inc.  
1441 Park Avenue, Sycamore, Illinois

Please send catalog information on Live Centers and OTHER IDEAL PRODUCTION SPEED-UPS as indicated:

- |   |  |
|---|--|
| <input type="checkbox"/> Electrical Etchers | <input type="checkbox"/> Tachometers   |
| <input type="checkbox"/> Demagnetizers      | <input type="checkbox"/> X-Pand-O-Laps |

NAME \_\_\_\_\_

COMPANY \_\_\_\_\_

ADDRESS \_\_\_\_\_

CITY \_\_\_\_\_ ZONE \_\_\_\_\_ STATE \_\_\_\_\_

**IT'S  
FAR SUPERIOR**  
**COMPARISON PROVES IT**



**DON'T BUY ANY AIR  
GRINDER UNTIL YOU'VE GOT  
THE FACTS ABOUT THE "M-B"**

**UTILITY** *Pneumatic*

**GRINDER**

**MODEL U-TR**

**A 60,000 R.P.M. UNIT**

A powerful, fast-cutting tool, streamlined in design, easy to handle. Designed for real production work and the toughest jobs. Precision made, excellent balance. Special grease-sealed bearings . . . no lubrication required. Fitted with steel housing, a special safety feature.

Also Other Grinders and Automatic Air-line Filters, Regulators and Lubricators.

**"Remember, Built-in Quality Remains  
Long After First-Cost Disappears"**

Representatives in Principal Cities  
Write for Literature

**M-B PRODUCTS**  
46 VICTOR AVE.  
DETROIT 3, MICHIGAN

### **Parker Hydraulic Control Valves**

Designed for smooth operation and accurate, responsive control, new hydraulic control valves are announced by the Parker Appliance Co., 17325 Euclid Ave., Cleveland 12, Ohio. These valves are the open-center, double spool type, and are offered in 3-way, 4-way or combination styles.

Sturdily constructed for heavy-duty service on construction and materials handling machinery, the valves may be used for either single or double-acting cylinders which are not required to operate at the same time.



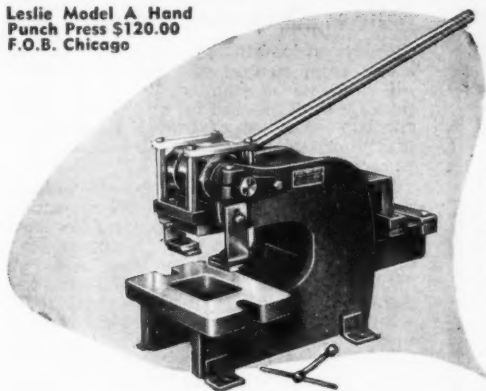
Operating at pressures up to 2000 p.s.i., they feature an externally adjustable, built-in, balanced seatless relief valve, with a minimum pressure rise even when by-passing oil at full pump capacity, thus preventing excessive oil temperature rise and keeping power input at a minimum. Pressure drop through the open center of the valve is approximately 32 p.s.i. at the rated capacity of 14 g.p.m., though flow rates up to 20 g.p.m. may be handled.

Any port size up to 3/4" pipe size may be provided for these valves. Operating handles may be mounted at either end of the valve, in an upright or inverted position. The return port may be located for direct tank mounting of the valve, and a float position (in addition to the regular raise, lower and hold positions) may be incorporated.

The valves are constructed of pressure-proof castings and hardened steel moving parts. Piston seals are of the standard lip type.

## A BLANKING DEPARTMENT FOR \$120.00?

Leslie Model A Hand  
Punch Press \$120.00  
F.O.B. Chicago



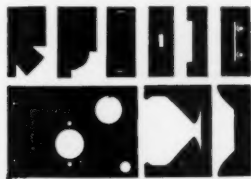
- 5 ton capacity
- Patented Leaf Assembly provides accurate punch and die alignment
- 6" throat depth permits reaching to center of 12" piece
- Large Punch Plate and Bed permits blanking over big areas
- Standard Punch and Die changes within 2 minutes

You can do most short run punching and blanking jobs faster, easier on a low cost Leslie Model A Hand Punch Press.

Diagram below illustrates versatility of this Press—each blanking done with 1 stroke.

Write now for illustrated catalog and circular showing punches and dies available from stock.

Tool your jobs at low cost from our wide variety of standard punches and dies.



LESLIE WELDING CO., 2941 Carroll Ave., Chicago 12, Ill.



### 374,220 PIECES PER GRIND with WILLEY'S SOLID CARBIDE REAMER

On this typical valve guide bushing, one man reamed 10,000 pieces per day, manually. Over 374,220 pieces were reamed per grind, with the reamer revolving at 1200 R.P.M.

Actual production reports demonstrate the superior quality of WILLEY'S METAL.

WRITE for CATALOG



## WILLEY'S CARBIDE TOOL CO.

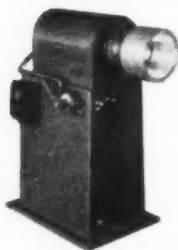
SOLE MAKERS OF WILLEY'S METAL

1342 W. Vernor Highway

Detroit 1, Michigan

# SCHAUER

## SPEED LATHES



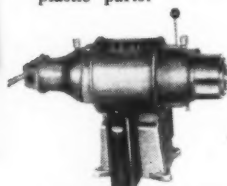
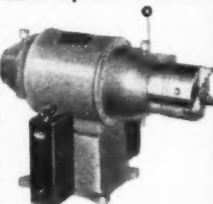
### Who Uses Them?

General Electric • Aluminum Co. of America • Studebaker • Thos. A. Edison • Ford Motor • Westing-

house Electric • Owens Illinois Glass • Lockheed Aircraft • Western Gear Works • Bryant Electric • Royal Typewriter • Yale & Towne • Eastern Airlines • Minneapolis Honeywell • Remington Arms • American Locomotive • American Brass . . . and several hundred more top drawer companies!

### Why?

Because Schauer Speed Lathes cut from 30% to 90% off the cost of polishing, filing, lapping or de-burring small metal and plastic parts!



• Chuck, collet or vacuum holding fixtures.

- Single speed, two-speed or variable speed models.
- SAVE WITH SCHAUER! Write for Bulletin 490.

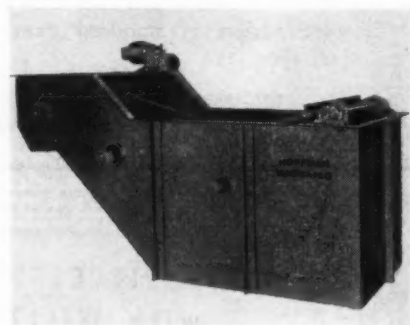
**SCHAUER MANUFACTURING CORP.**

Originators of Today's Speed Lathes  
2064 Reading Rd., Cincinnati 2, Ohio

## Hoffman "Magnaflor" Separator Unit

Fully automatic removal of ferrous solids from cutting oils and water soluble coolants is claimed for a complete package unit announced by the industrial filtration division of the U. S. Hoffman Machinery Corporation, 219 Lamson St., Syracuse 6, N. Y.

The new unit, called the "Magnaflor Separator", removes 75 to 90% of solids in a relatively dry sludge for easy disposal, according to the Hoffman announcement. Two of the five sizes of "Magnaflor" units in production are designed to serve individual machine tools with 20 to 40 g.p.m. flow rate requirements. The three larger sizes are intended for small groups of grinders with total flow rate requirements ranging from 60 to 100 g.p.m.



The illustration shows the side view of the Model MF-36 Hoffman "Magnaflor" separator unit. Dirty coolant enters in fluent pipe at right, and is returned in clean condition through the outlet at left.

In operation, the "Magnaflor" provides a 3½ to 5 minute detention period for larger solids to settle out of dirty coolant to the tank bottom of the unit. The coolant must then pass through a "Magnaflorplate", suspended at one end of the tank and containing fully immersed permanent magnets which attract and hold ferrous material to the face of the plate.

As the clean coolant is returned to the machine tool, a motor-driven drag-link conveyor equipped with non-magnetic flights, continuously scrapes down the solids from the plate. Both the solids, which are scraped down and those which settle out, are then pushed along the tank's bottom and up an inclined end by the conveyor. At the top of the in-



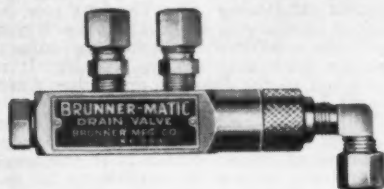
cline, the sludge is relatively dry before it drops into the discharge for disposal.

Vertical pumps of  $\frac{1}{2}$  h.p. and  $\frac{3}{4}$  h.p. size are furnished with "Magnaflo" models MF-12 and MF-24 respectively. These are the separators for individual tools. Larger size models do not include pumps which generally are already available in the plant.

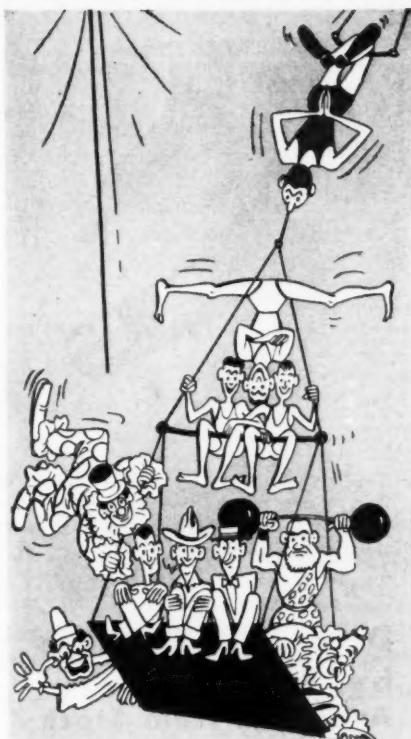
### Tank Drain for Air Compressors

The Brunner-Matic Tank Drain Valve is a unit of auxiliary equipment which is particularly useful to air compressor users, according to its maker, Brunner Manufacturing Co., Utica 1, N. Y. The device is simple in construction and positive in operation; it consists of only two moving parts—a piston and a valve ball.

The air released from the after cooler through the unloading device located on the electric pressure switch actuates the valve. When the tank pressure has reached the degree to which the pressure control switch is set, the contacts drop out, causing the unloading device to actuate. The air trapped in the after cooler located between the exhaust side of the compressor and the tank check valve is deflected through the Brunner-Matic, which is installed between this point and the tank drain outlet.



The Brunner-Matic Drain Valve can be driven by air exhausted from a centrifugal or magnetic unloader. The outlet port of such an unloader is connected to the top opening on the Brunner-Matic Valve. The blast of air released from the after cooler is utilized to actuate the piston of the Brunner-Matic. The downward thrust of the piston causes the valve ball to be depressed, allowing the air to be drained from the bottom of the tank, carrying with it moisture, oil and other impurities accumulated during the running cycle.

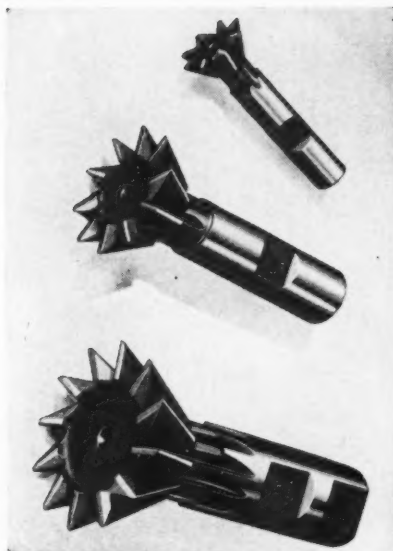


...but don't worry folks!  
Marvello the Great has a grip  
like a JACOBS  
CHUCK!



IF IT'S A  
**JACOBS**  
IT HOLDS

The Jacobs Manufacturing Co., West Hartford 10, Conn.



## Dovetail Cutters by Reltool... Available from Stock

Order these shank type dovetail cutters from your industrial distributor, or direct, for use in Reltool and other standard End Mill Holders. May be used in place of arbor-type and threaded-hole angle cutters. The ideal tool for milling dovetails with less set-up time, easier handling.

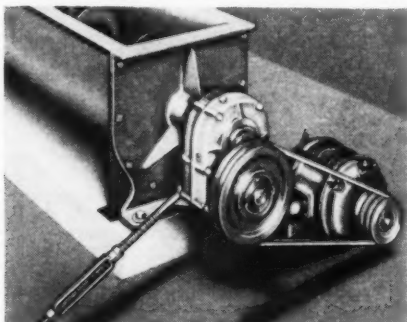
**The Reltool Line Includes:** Arbors • Center Drills • Counterbores • Die Sinking Cutters • Dovetail Cutters • End Mills • Form Tools • Gear Cutters • Hollow Mills • Keller Cutters • Key Seat Cutters • Lathe Mandrels • Metal Slitting Saws • Milling Cutters — all types • Reamers • Spotfacers • Step Drills • Taps • Tool Bits • Specials. Write for Catalog 50.



4540 W. BURNHAM ST. • MILWAUKEE 46, WIS.

## Dodge Torque-Arm Reducer for Output Speeds

A Torque-Arm Reducer for output speeds from 115 to 330 r.p.m. is announced by Dodge Manufacturing Corp., Mishawaka, Indiana, as an innovation in the field of power transmission machinery. It is claimed to be the first and only shaft-mounted reducer designed for this speed range. The new single reduction unit is being produced in four sizes, covering capacities up to 27 h.p.



The shaft mounting of the new unit which eliminates special engineering, the cost of a foundation, flexible couplings, sliding base, and the time consuming operation of lining up. The reducer is locked securely to the shaft-to-be-driven by means of two steel locking collars, one on each side of the reducer. It is anchored to the floor or any other fixed object by the Torque-Arm.

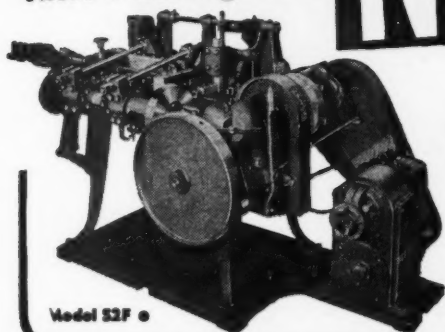
While this reducer can be driven through any V-belt drive, the designers recommend stock Taper-Lock Sheaves for facility either in installation or removal and for maximum efficiency of operation. A flat belt drive can also be used.

Any required output speed within the recommended range of 115 to 330 r.p.m. can be obtained with stock sheaves properly related in size. Variations in speed are accomplished simply by changing sheave sizes. Accurate adjustment of belt tension can be quickly made by operating the turnbuckle in the Torque-Arm.

Construction features include a cast iron housing, deep groove ball bearings, and helical steel gears, shaved for quiet operation and heat treated for long life. Wherever required to prevent reversal of direction of load, a positive backstop may be installed on the input shaft within the reducer where it is sealed against dust and dirt.

There's Nothing like a

# NILSON



Model S2F •

*For*  
**Rapid Production**

• **Combination Press and 4-Slide Forming Machine**

Extra rigid construction; tooling costs are generally lower; forming tools are interchangeable and easy to adjust. Send for catalog.

**A. H. NILSON MACHINE CO.**  
**BRIDGEPORT 5, CONN.**

Automatic Wire and Metal Forming Machines • Staple Forming Machines • Chain Making Machinery • Foot and Power Presses • Wire Reels • Wire Straighteners.

SPECIALISTS IN WIRE FORMING EQUIPMENT FOR OVER 50 YEARS

## District Managers MACHINE and TOOL BLUE BOOK

These men are excellently equipped by training and experience to work with manufacturers, advertising agencies and others interested in the promotion and sale of their products to readers of MACHINE and TOOL BLUE BOOK. Contact direct or through our Wheaton office.

**NEW ENGLAND and EASTERN N. Y. STATE**

Dan E. Reardon  
Box 259  
South Glastonbury, Conn.  
Telephone: GLastonbury 3-2400

**NEW YORK METROPOLITAN AREA**

Alvin E. Wailes  
c/o Hitchcock Publishing Co.  
55 W. 42nd Street  
New York 18, N. Y.  
Telephone: LAckawanna 4-4528

**PENNA., N.J., & S. ATLANTIC STATES**

Raymond J. Sietsema  
c/o Hitchcock Publishing Co.  
55 W. 42nd Street  
New York 18, N. Y.  
Telephone: LAckawanna 4-4528

**MICHIGAN & TOLEDO, OHIO**

John A. Wright  
8630 W. Outer Dr.  
Detroit 19, Mich.  
Telephone: KEenwood 2-6140

**OHIO, WESTERN NEW YORK, WESTERN PENNA., INDIANA, KENTUCKY**

Henry J. Smith  
3529 Radcliffe Rd.  
Cleveland 21, Ohio  
Telephone: ERview 1-0550

**MIDDLE WEST**

James C. Stewart  
222 E. Willow Ave.  
Wheaton, Ill.  
Telephone: WHeaton 8-3400

**DENVER, COLORADO**

Henry J. Niekirk  
1838 South Emerson St.  
Denver 2, Colo.

**PACIFIC COAST**

Fred Frisenfeldt  
1250 Wilshire Blvd.  
Los Angeles 17, Calif.  
Telephone: TUCKER 6703

**HITCHCOCK PUBLISHING CO. Wheaton, Illinois**

Telephone: WH 8-3400

**NEW!**

**NORTON  
PRECISION  
BUSHING\***

*Offers 3 Important Advantages*



**1. IMPROVED WHEEL BALANCE**

The new Norton precision aluminum bushing preserves every bit of the improved balance now built into Norton wheels by the new manufacturing process.

**2. MORE UNIFORM HOLE SIZE**

You get precision arbor fits because the new precision bushing has closer hole size tolerances.

**3. STRONGER HOLDING POWER**

The fluted outside of bushing plus method of pressing into wheel assures a firm bond even in fine grit wheels.

**AVAILABILITY**

Now being used in straight wheels 5" to 8" diameter—soon in other shapes and sizes.



\*PATENTED—

ANOTHER EXCLUSIVE  
NORTON FEATURE



**NORTON COMPANY · WORCESTER 6, MASS.**

Distributors In All Principal Cities

**Lindly "Step-Up" Drafting Scale**

A new precision engineering scale for making enlarged drawings of small parts, in ratios of 1 to 1, 2 to 1, 3 to 1, 4 to 1, 5 to 1, 8 to 1 and multiples of ten, is introduced by Lindly & Co., 80 Herricks Road, Mineola, L. I., N. Y. This new drafting scale, called the "Step-Up" enables draftsmen to make scale drawings quickly without recourse to any long-hand multiplication and a 1 to 1 scale. The user simply chooses the desired ratio, measures off the exact enlargement, and reads instantly the correct "stepped-up" dimension.

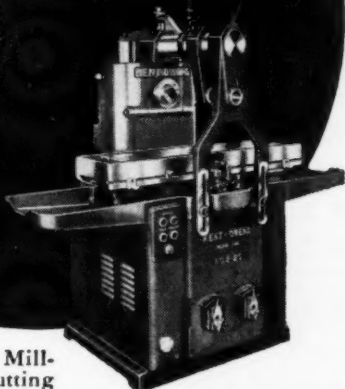
Use of this scale in the designers' own drafting and designing departments has shown savings in time up to 30% when working on small parts for machines,



electrical and electronic equipment, instruments, etc. Production engineers and drafting department heads should find that these scales cut costs, increase efficiency and become a necessity in the department.

**KENT-OWENS** *Plus Features*

**CUT YOUR  
MILLING  
COSTS!**



No. 2-20 Milling Machine  
Table, 42" x 12"  
Table travel, 20"

You'll find Kent-Owens Milling Machines the cost-cutting answer for tough milling jobs! They're rugged, simple, efficient... with practical features that reduce machining time... save labor... and maintain high precision. For example—*twin post head mounting* (an exclusive Kent-Owens feature) eliminates overhang and cocking action... *wide range of automatic cycles* means greater versatility... *only two gear contacts, motor to cutter* provides unusually simple and direct drive. Write for bulletins on wide range of hydraulic and hand-operated machines. Kent-Owens Machine Co., Toledo, Ohio.

## **KENT-OWENS** *Milling Machines*

The Lindly "Step-Up" Scale is made of fine boxwood with plastic facings, machine calibrated to the highest accuracy in decimal parts of an inch (not fractional). The concave, triangular type scale is double numbered, left to right, and right to left.

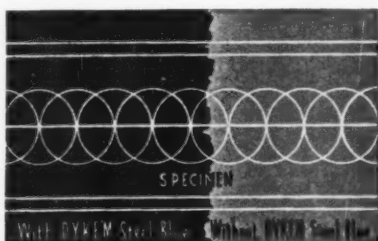
### **Gulf Improved Cutting Oils**

The Gulf Oil Corporation, 722 Gulf Bldg., Pittsburgh 30, Pa., has recently improved its Lasupar Cutting Oils. The new Gulf Lasupar Cutting Oils are stated to have the advantages of light color, good transparency, improved cutting ability,

and anti-rust properties, while retaining all of the performance characteristics of the former grades.

Good anti-weld properties and load carrying ability are obtained in the new oils by the inclusion of free elementary sulphur, sulphurized mineral oil, and sulphurized fatty oil. The sulphurized fatty oil provides high lubricity and anti-weld properties enabling the oils to produce excellent surface finishes.

In addition, efficient cooling and extreme pressure properties of these cutting oils permit their use over a wide range of machining operations.



## DYKEM STEEL BLUE STOPS LOSSES

### making dies & templates

Simply brush on, right at the bench; ready for the layout in a few minutes. The dark blue background makes the scribed layout lines show up in sharp relief, and at the same time prevents metal glare. Increases efficiency and accuracy.

Write for full information.

## THE DYKEM COMPANY

2301G North 11th St., St. Louis, Mo.

*Accurate - Fast*  
TAP and DIE  
WORK AT LOW COST

For Complete Information: Write  
CRAFT-HOLLOW INDUSTRIES  
WALLINGFORD, PENNSYLVANIA

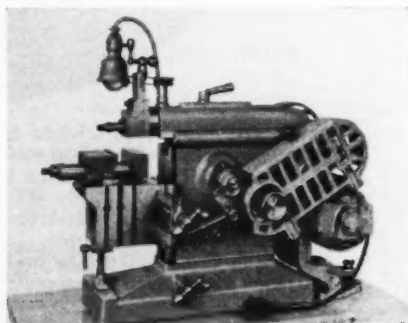
Set complete in case

**\$34.95**

## Delta 7" Precision Metal Shaper

A 7" precision metal shaper has been added to the Delta-Milwaukee line of metalworking and woodworking machines, according to an announcement received from the Delta Power Tool Division, Rockwell Manufacturing Co., Milwaukee 1, Wis.

This new shaper has the features of larger, more expensive machines. On work of 7" stroke or less, it saves time, labor, floor space, power, and set-up expense. It enables a plant to save the expense of operating a big shaper on small jobs. On all work up to a 7" stroke, the Delta Metal Shaper can do the job faster and at lower cost. For many jobs, setting-up takes as little as two to three minutes.



According to Delta engineers, the Delta-Milwaukee 7" Precision Metal Shaper is ideal for all-around tool-and-die or continuous-duty operations. It has four speeds: 40, 70, 115, and 180 strokes per minute. The extreme length of stroke is 7 3/4". The table has a horizontal travel of 9 1/2" and a vertical travel of 4 1/4". Feed ranges are from .003" to .018". The adjustable tool head is graduated from 0° to 90° for angle work and has a vertical travel of 3 1/4". The vise has a maximum opening of 4 1/4".

Attachments and accessories for the new Delta shaper include a portable cabinet, rotary table, index centers, key-way cutting tools, and an angle plate.

## Aget-Detroit Filterless Dust Collector

The Model 8N50 is the newest addition to the line of "Dustkop" Dust Collectors manufactured by Aget-Detroit Company, Ann Arbor, Mich. Rated at 885 c.f.m. with 3" static suction, the Model 8N50 is recommended especially where outside exhaust of cleaned air is required due to





## DI-LIFT TABLE "A"

### USES

Die Lifting  
Die Lowering  
Die Moving  
Supporting over-  
hanging work  
Bar Feeding  
Sheet Feeding

### DEPARTMENTS

Die Storage  
Plastic Press  
Turret Lathe  
Auto Screw Machine  
Stamping  
Sheet Metal

### SPECIFICATIONS

All steel  
Min ht. 26"; Max  
ht. 43"  
Table top 20"x32"  
Capacity 1 Ton  
Price \$189  
2 Week Delivery  
Order thru your Dis-  
tributor  
Catalog on Request Price \$159

Small hydraulic jack  
Model for tool  
Room Work  
Min ht. 27"; Max ht.  
42" Capacity 750  
lbs. Table Top 19"x  
28"

**MONTGOMERY & COMPANY**  
53 PARK PLACE • NEW YORK 7, N. Y.

state regulations, or to the presence of toxic fumes or vapors. Features of the unit are its portability, immediate installation and compactness (20" x 30" floor space). It is a standard unit available from stock.

A self-clearing, paddle wheel fan direct driven by a  $\frac{3}{4}$  h.p. continuous duty motor is capable of clearing lint and strings from buffing, chips, shavings and saw dust from woodworking operations as well as most types of dusts from chemicals, foodstuffs, etc.

Typical dust sources that are handled by Model 8N50 "Dustkop" are: grinding, buffing or polishing wheels, up to 12" diameter; woodworking equipment; multiple abrasive or sanding belts; dust from conveying, packaging and mixing of foodstuffs, or dust from chemicals, etc.

The dust laden air enters the unit at the 5" diameter inlet. Dust, dirt, chips, shavings, etc., are taken out in the cyclone separator and deposited in the dust storage compartment which is 9" x 20" x 28", and comprises the base of the unit.

The cleaned air, with any toxic fumes, objectional smoke, odors, etc., is exhausted to the outdoors through the outlet at the top of the cyclone. Ordinary sheet



metal pipe can be used to complete the installation. A further advantage for this type of equipment is that it is available from stock, thus reducing still further the time required in getting the dust control equipment in operation.

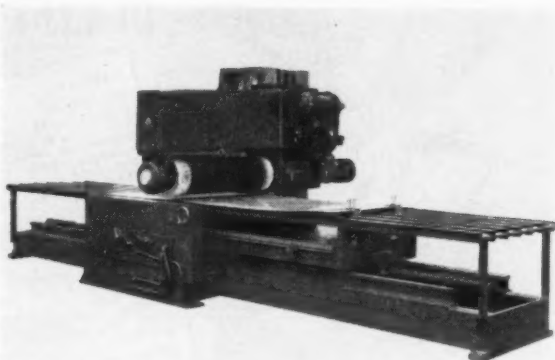
## Hill-Acme Oscillating Roll-Type Sheet Buffing Machine

The Hill Acme Co., Cleveland, Ohio, announces a 48" wide "Hill" open-side oscillating type Sheet Buffing Machine, with a hydraulic table and power elevating and lowering head for either an 18" diameter buff roll or a Tampico brush roll.

The "Hill" Buffing Machine is recommended for heavy-duty protection finishing of ferrous and non-ferrous sheets.

The oscillating mechanism is powered by a 3 h.p. motor and has a stroke variation of from  $\frac{1}{2}$ " to 2", and a range of 50 to 150 cycles per minute.

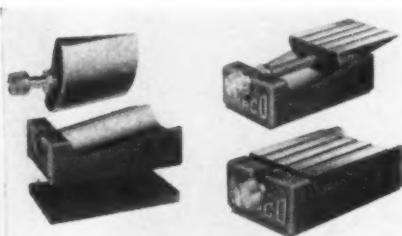
The main spindle is powered by a 50 h.p. to 100 h.p. main drive motor. The



machine is built in table widths up to 72" and table lengths of 8 ft. and over.

## Empco Machine Leveling Jack

A machine leveling jack, which features vibration absorbing mounting pads called Vi-Sorb, has been announced by Enterprise Machine Parts Corp., 2731 Jerome Ave., Detroit 12, Mich.



Vi-Sorb is the new vibration absorbing material which has been developed for use under heavy loads to eliminate creepage and reduce machine maintenance costs due to vibration.

It is stated that the Empco Jack Model JB-V-25 with a  $\frac{1}{4}$ " thick Vi-Sorb pad under a load of 92½ pounds per square inch, has reduced vibration 43%, while the Model JB-V-50 with a  $\frac{1}{2}$ " thick Vi-Sorb pad reduced vibration 74%.

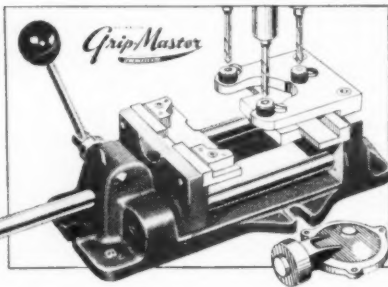
Lower in design, 2" high 6" long and 3½" wide, the new Empco Jack's self-aligning feature has been improved by compensating for more unevenness of floor while retaining full bearing of lifting surfaces up to maximum height of adjustment. A "Turn-O'-Screw" leveling feature saves time on installation and periodical re-leveling adjustments.

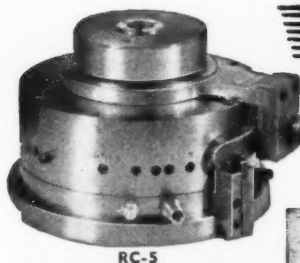
## HAVE TO CUT COSTS? THIS SCREWLESS VISE CAN SAVE YOU UP TO 75% ON TOOLING COSTS

Extra time and labor savings in production work can be yours when you use Heinrich "Grip-Master," the original screwless vise. Instantly adjustable; has positive lock that hammer blows cannot break. No leveling of work necessary. Ideal as a base structure for jigs and fixtures. Write for free folder or ask your Dealer for a demonstration.

**NATIONAL MACHINE TOOL CO.**

Dept. 101-B • RACINE, WISCONSIN





RC-5



## INDEX CHUCK

with Air Operated Collet

Uses Brown & Sharpe type collets. Capacity:  
1/16" to 2".

No. FC-28

V-29

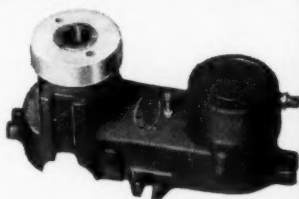


Air Foot Control  
and Valve



## COLLET AIR CHUCK

Uses Brown & Sharpe type collets. Capacity 1/16" to 3 1/2".  
Write for literature and prices



**REDMER AIR DEVICE CORPORATION**  
BOX 247 GUNTERSVILLE, ALABAMA

# STOP DUSTS *with* DUSTKOP

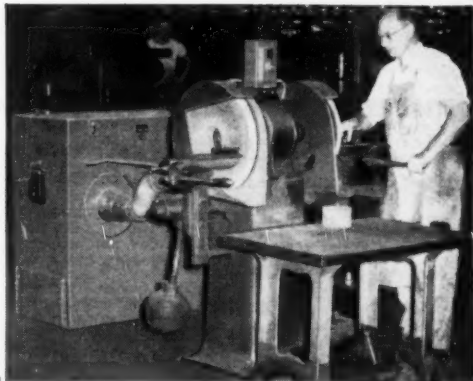
- Surface Grinders
- Tool Grinders
- Cutter Grinders
- Abrasive Belts, Discs
- Polishing, Buffing . . .  
. . . any industrial dusts.

22 different Dustkops  
300 cfm to 10,000 cfm  
available from stock . . . dusts from

Send now for new Catalog 605b.  
Describe dust problem for recom-  
mendation by return mail; no  
obligation.

**AGET-DETROIT CO.**

205 Main St. Ann Arbor, Mich.



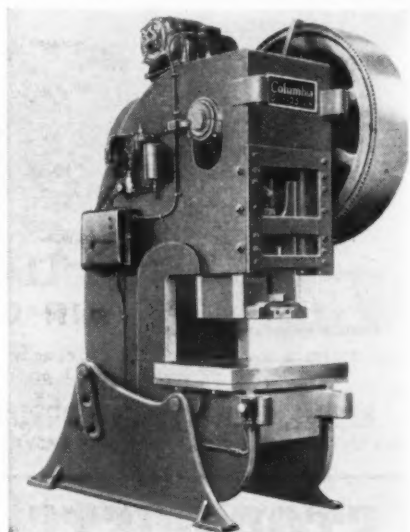
## New Columbia O.B.I. and Gap Presses

Columbia Machinery and Engineering Corporation, Hamilton, Ohio, has developed a complete line of Single-Crank Open Back Inclined and Gap Presses. Designed for stamping, drawing, blanking, coining and embossing, the new line includes O.B.I. presses in a complete range of sizes from 10 to 200 tons capacity, inclusive, and gap presses in capacities from 60 to 200 tons. Two basic designs are used: one for presses up to 45 tons capacity and a heavier, more rugged design for larger units. Even within each basic design, many parts are specially designed for individual models to provide maximum efficiency and dependability.

Features of the smaller presses include the use of a cone-type clutch and location of the clutch on the crankshaft. The cone-type clutch is lighter and more compact than friction-disc clutches formerly employed, and the flywheel effect is reduced, with a corresponding reduction in starting current consumption, heat generation and wear on the clutch and brake linings. Location of the clutch on the crankshaft allows the flywheel to be placed outside the housing and permits use of a smaller bull gear, giving more room for die set-up and operation. With this construction, a different group of gear teeth engages at each stroke, eliminating excessive wear on a few teeth.

Both O.B.I. and Gap Presses in larger sizes use the new patented Alcone aluminum cone-type clutch which reduces size and weight with a correspondingly large reduction in flywheel effect. The 12° degree cone is actuated by 1/5 the cylinder area required for friction disc clutch operation, permitting use of a smaller, lighter cylinder. Alcone design also permits the adjustment to compensate for wear to be incorporated in parts which do not have to be started and stopped.

These features serve to reduce the flywheel effect, further permitting faster starting and stopping, with more press cycles per minute. At the same time, aluminum parts quickly dissipate heat and, since the clutch and brake linings are fastened to inner members, heat



generated in starting and stopping is thrown outward and more quickly dissipated. As a result, it is claimed that wear on engaging surfaces is greatly reduced and adjustments and maintenance are required only at long intervals.

Inclined presses may be inclined to a maximum of 25° from the vertical and the point of suspension is located to



**Uneeda  
LIGHT**

Write for  
Literature

**DIRECTS A BEAM OF WHITE LIGHT ON YOUR CLOSE PRECISION WORK**

Tool and Die Makers acclaim it for utility, getting into nooks or crevices hard to reach with ordinary light—for lining up punches in dies or working with the scriber in close places. Completely adjustable and portable. Light does not reflect back to your face. Ideal for inspectors seeking burrs, flaws, etc.

Price complete with 2 size bulbs \$12.50.

**TWENTIETH CENTURY  
MANUFACTURING CO.**

1726 MONTROSE AVENUE CHICAGO 18, ILLINOIS

minimize rise of the bed and avoid awkward feeding positions when the press is inclined. The presses and die cushions are designed to allow the operator sufficient knee room at any angle of inclination and to permit installation and removal of cushions through the die space without changing the angle of inclination.

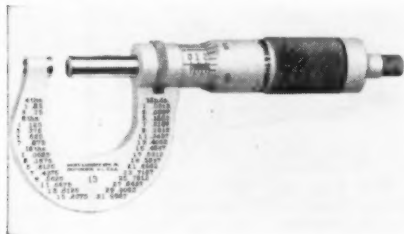
All presses in the new line are of all-welded rolled steel construction with cast-iron slides with extra long gibways and with high-strength cast-iron pitmans and precision alloy steel adjusting screws. On larger models, pitmans are provided with a special plug-type locking device developed by Columbia engineers.

The crankshaft is a heat-treated, medium-carbon steel forging with extra-large crankpins and both the steel gear and heat-treated alloy-steel pinion have precision-machined teeth. Main and crank-pin bearings are removable heavy-wall, high-tensile bronze bushings while the flywheel and backshaft of geared-type models operate in heavy-duty anti-friction bearings.

### B & S Outside Micrometer Calipers

Brown & Sharpe Manufacturing Co., Providence 1, R.I., offers a new line of outside micrometer calipers having many desirable features which make precision measuring easier, accuracy surer and the micrometers longer lived—features which will appeal to the mechanic and machine operator, according to the manufacturer.

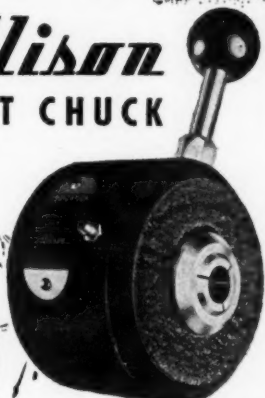
A few of the major improvements include carbide measuring faces; a large diameter thimble with wide spaced divisions for easy reading; a one piece stainless steel spindle and screw, permanently rustproof; hardened and ground threads, for a long accurate life.



Additional features of this advanced line of micrometers include a dull chrome finish; black figures and graduations; new sliding taper thread adjustment; positively locked screw and thimble; easy and quick thimble adjustment; and a longitudinal thimble adjustment.



**Allison**  
**COLLET CHUCK**



**NO STOPPING  
NO KEYS  
NO WRENCHES  
NO PRODUCTION  
DELAYS**

Meet sudden demands for high speed production by having every lathe equipped with the Allison Collet Chuck. Gives full spindle bore capacity to any lathe having 1 1/2"-8 thread spindles. Requires no keys, wrenches, reverse switching or stopping. Operator simply draws lever ball toward him to tighten collet; pushes it away from him to release. Mail the coupon for complete, illustrated description and prices. INQUIRIES FROM MILL SUPPLY DEALERS AND DISTRIBUTORS INVITED. Use business stationery.

ALLISON CHUCK PRODUCTS  
738 20th Street  
San Pedro, California

Please send catalog page, prices and name of nearest supply house.

NAME

ADDRESS

CITY  STATE

## Superior Model AL Honing Machine and Mandrel Driver

The Model AL Honing Machine has recently been introduced by Superior Hone Corp., 1610 Elreno St., Elkhart, Ind. This new unit is provided with infinitely variable speeds; its honing range is from .185" diameter upward. Permanent-type mandrels permit the honing stones alone to come in contact with the work piece, assuring extended mandrel life. Since only the stones touch the material to be honed, foreign marks on the honed surfaces are eliminated.



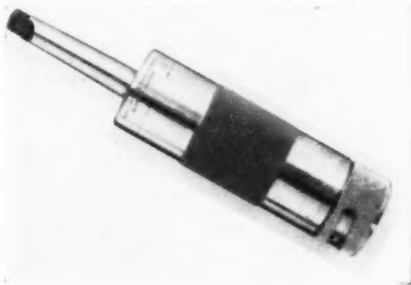
The ball bearing spindle of the Model AL reduces friction and provides for smooth operation. A variable speed V-belt drive unit enclosed in the base, allows an infinitely variable speed range of from 250 to 1150 r.p.m. Speed adjustment is through a hand-operated dial on top of the machine.

To control the spindle drive, a disc clutch is used, mounted on anti-friction ball bearings, controlled by a foot pedal. Release of the pedal pressure automatically sets the disc type brake, immediately stopping the spindle.

The machine is equipped with a  $\frac{3}{4}$  h.p., 220/440 volt, 60 cycle, 3 phase motor to drive the spindle. A 25-gallon coolant tank is provided in the machine's base; the coolant pump is driven by a 220/440 volt, 60 cycle, 3 phase motor.

Controls for stone pressure against the workpiece and for expansion and contraction of the stone position on the mandrel are located within convenient reach of the operator.

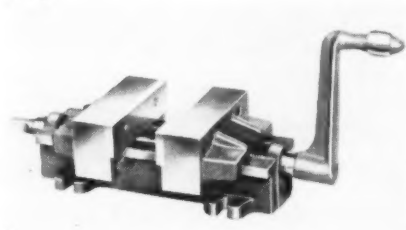
The Superior Model MD-1 Mandrel Driver, illustrated below, is recommended for speedier production of hole finishing with greater accuracy. This tool converts a drill press into a vertical honing machine. It is stated to be ideal for die work,



bushings, dowel pin holes, etc. All types of internal finishing and sizing where accuracy and finish are important may be accomplished with the MD-1 Mandrel Driver.

## Graham Centering Vise

This rugged, compactly designed Centering Vise is the latest addition to the line of quality vises made by Graham Manufacturing Co., 50 Bridge St., East Greenwich, R. I. The new vise is designed to locate the center of the work at a desired point on the machine table, making the unit particularly useful in cases where the outside dimensions of the work vary.



The vise can be loaded and unloaded faster than a conventional vise, according to its makers, because both jaws open and close simultaneously. For operating convenience, the vise is designed so that the crank can be used on either end. The jaws are 6" wide,  $1\frac{1}{2}$ " high, and open to  $6\frac{1}{4}$ ". Close tolerances are held on faces, tops and sides of the jaws in order to insure flush assembly. V-jaws are available to center varying sizes of round work.



# Anderson BALANCING WAYS

Shops handling rotating parts find this simple, sturdy and thoroughly dependable device highly efficient for balancing and truing operations. It assures better work . . . saves time . . . saves labor. No leveling required.

Four chilled iron discs rotate with minimum friction on sensitive special bearings, giving a quick, accurate indication of whether or not the work is in perfect balance.

Swing	Between Standards	Capacity in lbs.
20 in.	20 in.	1,000
40 in.	30 in.	2,000
60 in.	30 in.	2,000
72 in.	66 in.	5,000
96 in.	88 in.	10,000

**No Leveling Required**

Write for Bulletin No. 1-5

**ANDERSON BROS. MFG. CO., Rockford, Ill.**

Balancing Ways, Roto Checkers, Hand and Power Scrapers, Spotters, Hand and Power Hydraulic Straightening Presses.



## Economy's CLOSE-TOLERANCE DRILL-JIG BUSHINGS AND GAGES MEET YOUR HIGHEST STANDARDS

All A. S. A. standard types and sizes are in stock, ready to fill your order. And if you need new gages or gages salvaged by hard chromium plating, you can also depend on fast delivery. Write for bulletin and price list.

**Economy TOOL & MACHINE CO.**

1829 SOUTH 68th STREET • MILWAUKEE 14, WISCONSIN

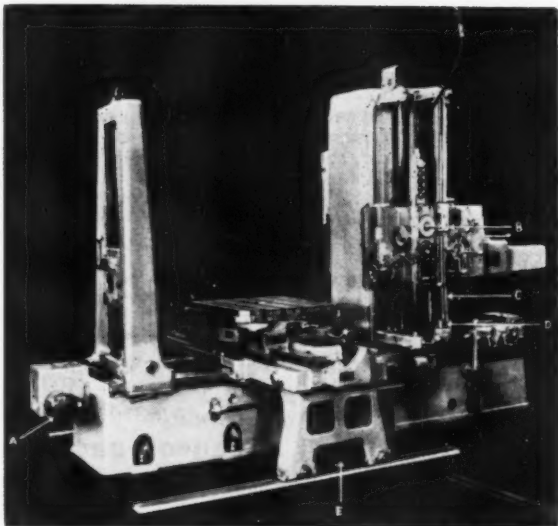
## G. & L. Electrically Operated Positioning Device

Positive automatic machine settings within .0002" to .0005" are now possible with a new electrically operated positioning device announced by the Giddings & Lewis Machine Tool Co., Fond du Lac, Wis. With this new unit, horizontal boring machine table and headstock fine feed movements to predetermine settings are mechanically controlled without resorting to time-consuming final hand adjustments.

This quick-acting device is said to reduce considerably the time ordinarily taken to locate work for precision machining operations. Designed as a standard accessory for table-type machines, equipped with saddle supports and auxiliary runways, the device is equally efficient for use on a single workpiece requiring a series of bores, or on a quantity of parts produced in job lots. In addition to time saved in work setting, this accessory reduces the need for special jigs and fixtures.

The automatic positioning device consists of two complete control units, one for the lateral setting of the table on the saddle and the other for the vertical setting of the headstock on the machine column. These units may be operated individually or simultaneously. When components of the positioning device are activated, they disengage the table and headstock rapid traverse directional controls, and then automatically position the table or headstock in its final setting.

When the automatic positioning device is used, a starting point, anywhere on the face of the workpiece, is determined. Measurements are then made from this point with conventional type-end-measuring rods if a single part is being precision bored. For production work, a job rod, bored with various hole spacings on each of its four sides to receive a stop pin, is used to simplify repetitive settings. These measuring units rest between an adjustable stop and a permanently mounted dial indicator. The adjustable stop must be set at the extreme left of the table, standard procedure when using any conventional end-measuring rods. Pre-



cision measuring units of the same type are clamped to a vertical shaft attached to the machine column to control headstock settings.

After the desired travel has been determined and the rods are in place, machine directional controls are manually engaged. The machine table and headstock move in rapid traverse until the directional clutches are automatically disengaged by a selector switch in the precision measuring device. There is a slight coast or over-travel of the table or headstock of approximately .005" to .010" at this point in the positioning cycle.

During this interval of travel, a master electrical switch is energized to start a motor connected to a reduction gear unit. Through a magnetic clutch attached to the reduction unit and the machine feed screw, the table and headstock are automatically fine fed in return within .0002" to .0005" of the desired precision machine setting. When this precise point is reached and shown on the dial indicator, the magnetic clutch disengages. The indicator is used for only the first setting and after this has been established, it merely serves as a reference for subsequent locations. All measurements are made automatically by the precision positioning device without actual need for the indicator.

**NOTCHING TUBING OR  
PIPE ENDS EASILY WITH**

**ARC-FIT**

Patent No. 2,126,819

**IN POWER PRESS  
OR HAND PRESS**

Arc-Fit is a notching unit for preparing pipe or tubing ends in making welded or brazed tubular joints. Arc-Fit will prepare the ends of a pipe or tube in less than 5 seconds. Arc-Fit is a production tool that will cut your production costs. It is applicable in any industry where pipe or tubular construction is used.

- Arc-Fit can be utilized in any power press.
- Arc-Fit can be furnished for any size tubing or pipe.
- A hand press can be supplied with Arc-Fit units for shearing pipe or tubing sizes 2 inches or under.



- For sizes over 2", angular cuts other than 90°, and slotting operations. Quotation furnished on request.
  - Arc-Fit does not deform pipe or tube. No grinding or finishing operation is needed.
  - Engineers can now design for tubular construction and cut costs.
- Write today for circular and prices.

Manufactured Exclusively by

**VOGEL TOOL & DIE CORPORATION**

2525 Moffat Street

Chicago 47, Illinois

**Make A Clean Impression!**

**Hand-Cut STEEL STAMPS**

**Letters & Figures**



CHAMFERED CORNERS  
For locating the base



REVERSE  
FOR  
MOLDS AND  
DIES

Deep, hand-cut letters in special-formula steel assure clean impressions and long service. Face of stamp is angled for extra strength. Chamfered corners for locating the base. Ask for Hoggson Brand at mill supply houses.



**HOGGSON & PETTIS MFG. CO.** 141-H BREWERY STREET  
NEW HAVEN, CONN.

## GRANT RIVETERS...

**PIONEERS  
and  
PACEMAKERS  
in their line**



—head rivets from smallest to  $\frac{3}{4}$ " diameter either by NOISELESS SPINNING or VIBRATING HAMMER method—Sizes to meet all needs—types include Vertical and Horizontal Multiple Spindles.

Write for literature and don't forget to send samples.

**THE GRANT MFG. & MACHINE CO.**  
C E Station, Bridgeport 5, Conn.

## ECONOMY HEADLESS AND SOCKET SET SCREWS

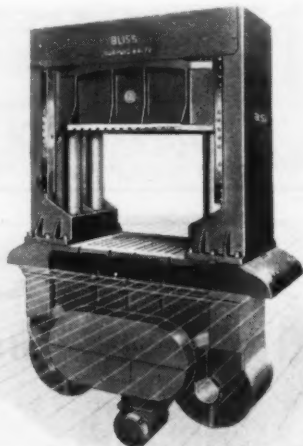


**TRY THEM ON YOUR  
NEXT JOB**

**ECONOMY MACHINE PRODUCTS**  
5212 LAWRENCE CO. CHICAGO 30, ILL.

## Bliss 4-Point Underdriven Press

A new line of four-point underdriven eccentric presses is announced by E. W. Bliss Co., 1426 Hastings St., Toledo 7, Ohio. Developed in cooperation with leading automobile builders, the design features easy accessibility of all parts, minimum service requirements and heavy construction, suiting the press for the severe usage usually found in automotive stamping plants. The new line of presses is designated SU-4 after the Joint Industry Conference system for single action, underdriven, four-point presses. Sixty-three standard sizes have been engineered, with capacities ranging from 300 tons up to 3,000 tons and bed areas from 72" x 48" to 300" x 108" (r. to l. by f. to b.). Heavier capacities can be built to order.



All bearings of these presses are arranged to permit the shafts to be dropped straight down, without the necessity of pulling. The presses are double geared, with the driving eccentrics cast integral with the main drive gears. All gears can be arranged to run in oil.

The fast acting Bliss single disc pneumatic friction clutch does not require adjustment for wear, and friction plates are arranged for rapid heat dissipation.

Connections are unusually long, resulting in small minimum side thrust. Sideposts are fully skirted at the connection joint, and are arranged with internal pre-shrunk steel tie-rods which absorb the work load. The motor driven slide adjustment mechanism meshes with ex-

# MULTIPLE DRILLING with a . . .



## MULTI-DRILL

**Increases Capacity  
Up to 800%**

**ADJUSTABLE TO ANY HOLE PATTERN  
FITS ANY DRILL PRESS**

If your production requires drilling from 2 to 8 holes in a work piece, a MULTI-DRILL will cut costs and speed output up to 800%. The MULTI-DRILL is universally adjustable to any hole pattern — is compactly built to permit easy, unhampered operation with drill jigs or other special fixtures. Ruggedly built to take the wear and tear of high production work, the MULTI-DRILL will handle your long and short run multiple drilling jobs with ease and economy. The MULTI-DRILL will drill on hole centers as close as  $\frac{1}{16}$ " — handle drill sizes up to  $\frac{1}{2}$ " in steel. Special adaptations available.

There is a Commander MULTI-DRILL Distributor in your area. Write for his name, literature and complete details.

**COMMANDER MFG. CO.**

4227 West Kinzie St.

Chicago 24, Illinois

**Product of Commander — Builder of the Commander Tapper**

ternal threads on the top of the side posts, allowing extremely long adjustment where it is desired, merely by lengthening the threaded portion of the posts. Since the work load is carried entirely by these side posts, there is no need for tie-rods in the frame of the press. The frame uprights are full box sections, and have wide bases for exceptional rigidity.

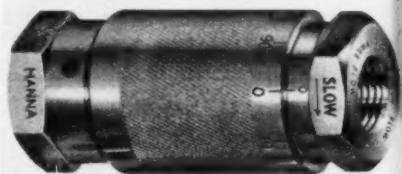
### Hanna Speed Control Valves

A new line of "Flo-Set" Speed Control Valves is announced by Hanna Engineering Works, 1765 Elston Ave., Chicago 22, Ill. The valves, available in three sizes— $\frac{1}{4}$ ",  $\frac{3}{8}$ " and  $\frac{1}{2}$ "—feature micrometer graduations for precision speed control of low pressure cylinders. A fourth speed control valve, the  $\frac{1}{4}$ " Jr., specifically designed for use with tubing, functions the same as the larger size valves, but does not include the micrometer adjustments.

The new valves are suitable for air, water or oil control, with maximum pressure to 250 p.s.i., and maximum temperature to 250° F. They may be mounted in any position.

The face of one end is marked "Controlled Flow Out—Free Flow In" and the other end face is marked "Controlled

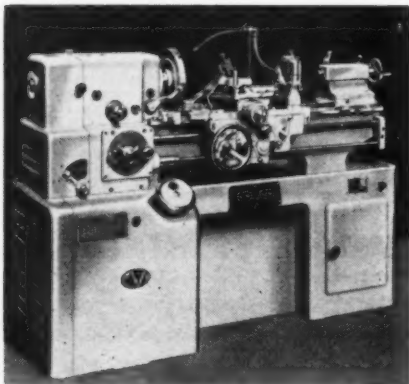
Flow In—Free Flow Out." Controlled flow means that the orifice controlling the flow can be adjusted from zero to full size opening, with one revolution of the adjustment sleeve. Graduations are in hundredths of a revolution, with each hundredth representing 1/100 of the pipe area. Free flow means unrestricted flow through an orifice equal to the pipe area.



The valves are designed so that the inside construction is not damaged if excessive torque is applied during installation. All metal parts are made of aluminum except for stainless steel springs.

## DCMT Precision Toolroom Lathe

This Precision Toolroom Lathe is available through DCMT Sales Corp., Dept. 1A, 164 Duane St., New York 13, N. Y. The bed design of deep cross section for rigidity is cast in semi-steel, and has flame hardened and precision ground ways. All parts subjected to wear are hardened and ground, ball and roller bearings are fitted throughout. The bed measures 61" overall length; distance between centers is 30".



The headstock spindle is carried by two pairs of angular contact ball bearings, each separately housed in an oil bath. Nose bearings are of heavy type and accurately pre-loaded to precise float. Lubrication on remainder of the headstock is by splash feed in the main chamber. The spindle register for chucks, etc. is of conical form, attachments being secured by three quick-release cams of positive action.

Twelve spindle speeds are provided, with a 25-1645 r.p.m. range. Transmission

is mechanical, and gear selection is by a dual range dial in conjunction with a fast and slow lever. Drive gears are oil immersed, and controlled by a friction clutch of conventional design through a lever mounted close to the headstock nose.

A totally enclosed auto-lock feed gear box is oil immersed. Threads and feeds are indicated on a large dial and changes are rapidly effected by the turn of a knob. The precision leadscrew is carried by three ball races, two angular contact for adjustable thrust, and one self-aligning. The chasing dial and nut release are incorporated, and in addition, the leadscrew (1" in dia.) may be disengaged or reversed by a knob-operated single dog clutch at the headstock. A range of 82 threads can be cut from 3-92 t.p.i., and .25-4 mm. pitch.

Saddle ways of extra length are automatically pressure lubricated, the volume of oil delivered being in direct proportion to duration of travel. Vertical support is given by four adjustable ball races. Movement of the saddle is  $27\frac{3}{4}$ ".

The cross slide screw is totally enclosed, pressure lubricated, and has an adjustable split nut. A unique easy set stop facilitates thread or groove cutting. Cross-feed and saddle feed are controlled by two lever-operated friction clutches. A feed reverse is provided in the oil immersed apron, and feeds range from .001" to .061" per revolution.

Taper turning attachment with adjustable ball bearings on all sides is rigidly designed and shown in direct readings; inches per foot and degrees. Settings are made by a worm driven dial, graduated to  $1/60^\circ$ .

Both drive and pump motors are protected by the usual overload relays controlled by push button above headstock. Relays are built in a compartment at the rear of the machine, the cover of which is provided with a safety insulator.

## Get Out Those BROKEN TAPS!

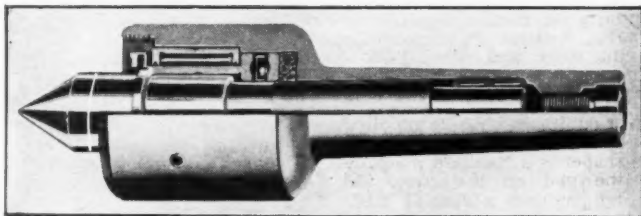
Get 'em out with "WALTON" TAP EXTRACTORS, the inexpensive tools for removing broken taps from all kinds of work. Shop proven; fast; economical. See your jobber, or write us for Folder No. 12 and details of free trial offer.

**THE WALTON COMPANY**  
Hartford 10, Connecticut





## NOW Give Production a Lift!



Boost production of high speed turning operations. Use MOTOR TOOL LIVE CENTERS (Ball and Roller Bearing). The only center with the RED BAND OVERLOAD INDICATOR, which prevents overloading of thrust bearings.

Designed for long trouble-free operations. MOTOR TOOL LIVE CENTERS require minimum care for maximum production.

Write for bulletin giving all the advantages of these Live Centers.

**ACME TOOL COMPANY**  
71 WEST BROADWAY NEW YORK 7, N. Y.

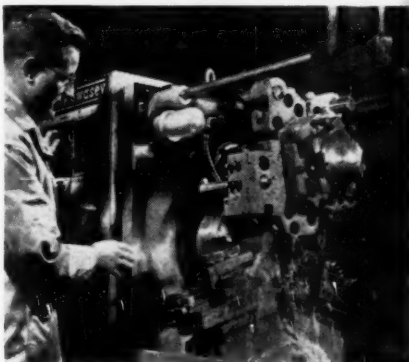
### Threading Capacity of W & S Single Spindle Automatics Broadened

Two new optional arrangements are offered by The Warner & Swasey Company, on its 1-AC single spindle automatics to broaden threading performance. The standard machine is normally equipped to cut right-hand threads of from 12 to 32 pitch with collapsible taps or self-opening die heads.

One new arrangement provides a 10 h.p. open-frame, intermediate slip, reversing-type main drive motor so that solid taps or die heads may be used as well as the self-opening types. This is a straight-forward method which involves no mechanical changes in the machine, while maintaining tapping torque in proportion to the capacity of the main drive motor and speed of spindle. A fixed trip on the machine's pentagonal selector drum actuates a limit switch ordinarily used to cut in a late cross slide, but which in the tapping cycle is used instead to reverse the motor. When the motor reverses, the tap feeds out of the work at the prescribed rate and the machine then cuts back into rapid traverse reverse. Feed range by change gears is the same as the standard machine, from .002" to .083".

The second arrangement combines the

use of a reversing motor with a new feed and threading transmission incorporating two additional planetary shafts so that a wider range of threads may be cut, either right or left hand.



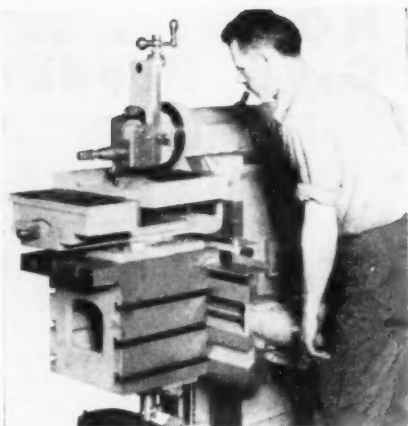
Leads of .1666 to .0132" (6 to 32 pitch) for left-hand threads are available, and the right-hand range is from .143" to .0312" (7 to 32 pitch), obtained by change gears. Eighteen feeds are also provided.

## Cincinnati Shapers for Duplicating Contours

A new follower-type shaper for duplicating contours on metal parts has recently been introduced by the Cincinnati Shaper Co., Hopple, Garrard & Elam Sts., Cincinnati 25, Ohio. The machine illustrated is used for automatically shaping contours on dies, clamps, cams and other parts, without laying out the contour on the work and shaping to a line as is normally done when shaping parts of this type.

The follower equipment can be supplied on any stroke or size of Cincinnati Shaper. The shaper is a standard machine except for the pad on the base, the masterform holder and a special table support post. It can be used for regular shaper work as well as automatic duplicating. Changeover is simple and quick, the manufacturer states.

The rail elevating screw is disconnected and retracted when duplicating, so that the table and rail are free to move vertically. The rail and table are supported on the masterform by the steel support post equipped with a roller. The masterform to be duplicated is made of  $\frac{1}{2}$ " steel and clamped in the holder that is secured



to the pad on the base. The table progresses horizontally by automatic feed. The table, rail, and work follow the vertical and horizontal movement of the roller as it travels over the masterform.

A die as illustrated in the picture is

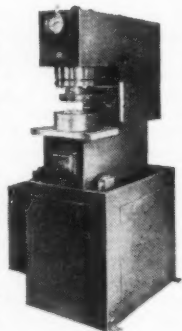
**PRODUCTION UP  
1500%**

## M & N SOLVES A PROBLEM ... Client Cuts Costs

The U. B. Company (name on request) was producing 30 buffing wheels an hour—using ordinary hydraulic equipment. Consultation with M & N engineers brought about plans and subsequent building of the M & N "C"—Frame press illustrated. HOURLY PRODUCTION JUMPED TO 450 UNITS!

M & N Hydraulic Presses are available from 5 to 75 ton capacity, compactly built and self-contained. Press may be operated manually, by foot, or push button. Double acting cylinder provides power ram return at high speed. This M & N "C"—Frame press features automatic reversal of pressure setting.

M & N Presses are successfully used for drawing, forming, powder metallurgy, silversmithing, punching, stamping, and a wide range of other industrial uses.



**DEALER INQUIRIES INVITED  
Write today for BULLETIN 102 A**

**M & N MACHINE TOOL WORKS, INC.  
299 ALLWOOD ROAD CLIFTON, N. J.**

# Beverly THROATLESS SHEAR

## *Cut any Shape...* STRAIGHT OR IRREGULAR



MODEL B-3 with  
Ball Bearing Hold Down

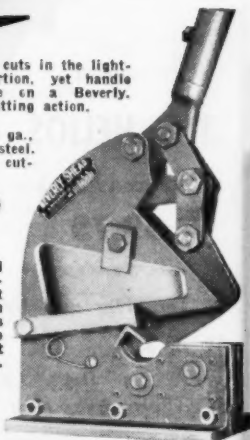
Make straight or intricate cuts in the lightest metals without distortion, yet handle heavier gauges with ease on a Beverly. Smooth, powerful, clean cutting action.

Made in 4 sizes to handle 18 ga., 14 ga., 10 ga., and 3 16" mild steel. H.C.H.C. Blades available for cutting stainless steel.

### NEW WIRE ROPE AND CABLE CUTTER

Cuts wire rope and heavy electrical cable at one stroke. Circular cutting action assures finished cut at one stroke. Snap-Action Hold Down permits instantaneous adjustments for varying sizes. Capacity: wire rope 1 1/16"; aperture 1". Weight 30 lbs.; base dimensions 8" x 5".

Write for illustrated circulars on Beverly Cost Cutting Tools.



BEVERLY SHEAR MFG. CO., 3005 W. 111th St., Chicago 43, Ill.

# 100 times greater wear!

FOR  
HIGH SPEED  
PRODUCTION—  
MAXIMUM  
PRECISION



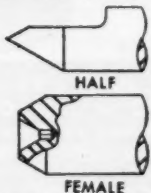
## RED-E CENTERS

### HIGH SPEED and CEMENTED CARBIDE TIPPED

Our new heat process results in a hardness of the high speed steel to such a degree that the center will outlast any other make and assure hairline precision, day-in and day-out.—Carbide inserts especially selected for maximum abrasive wear resistance.

The obvious savings in time, money and replacement justifies use of RED-E centers. Write for Bulletin.

CENTER Specialists Since 1908



RED-E TOOLS

READY TOOL COMPANY

550-B Iranistan Ave.

Bridgeport 5, Conn.



.001" and  
0.1 mm vernier

## THE HELIOS

Guaranteed Accuracy

**\$9.75**

f.o.b. New York

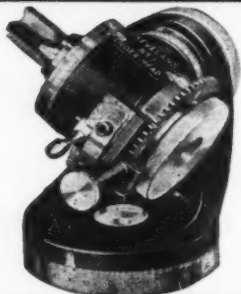
Importer and Mfrs. Agent

**KARL A. NEISE**

Dept. B.B.

381 Fourth Ave., New York 16, N.Y.

## TOOL HOLDER INDEXING HEADS



Holds 1/16" up to 1 1/2" Tools  
SC or IAM Collets and Brown &  
Sharpe or Morse Taper. Will adjust  
to any compound angle.

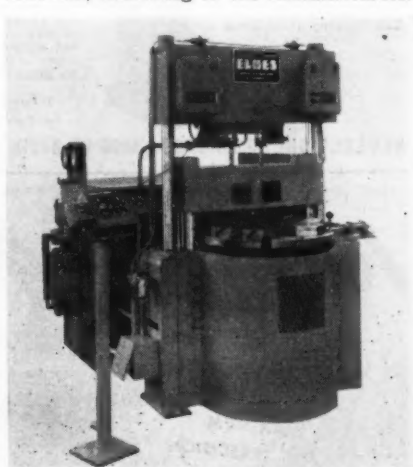
**GRINDERS & FIXTURES INC.**

8327 Clinton Road Cleveland 9, Ohio

machined by feeding the tool slide down in consecutive cuts to rough out the die and, with a final finish cut, to complete the surface. The limiting angle of climb is approximately 20°. The device is simple and attractive for applications within its limits. Cincinnati Shapers may be equipped with other types of duplicating followers for more intricate contours or shapes.

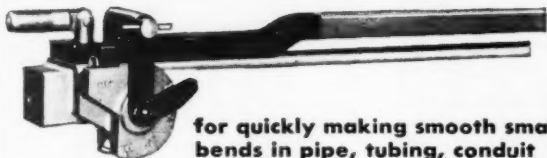
## Elmes Transfer Press for Molding Rubber

A new hydraulic transfer press, designed for the molding of small rubber parts around metal inserts, is announced by Elmes Engineering Division of American Steel Foundries, 1150 Tennessee Ave., Cincinnati 29, Ohio. Parts are produced at the rate of 20 units per two-minute cycle—ten units per minute—a substantial increase over previously used methods, according to the manufacturers.



This press is equipped with two transfer rams, each of 20 tons capacity. The moving-down die clamp has 60 tons capacity. The lower halves of the die are mounted on a rotating 3-station table providing nearly continuous processing of material, permitting curing and unloading while material is being molded. The press has semi-automatic timed cycle controls, push-button operated, with inching features for all movements. The rotating table is mounted on a circular steam plate to maintain die temperature when the dies are out of pressing position.

## GREENLEE HAND BENDER

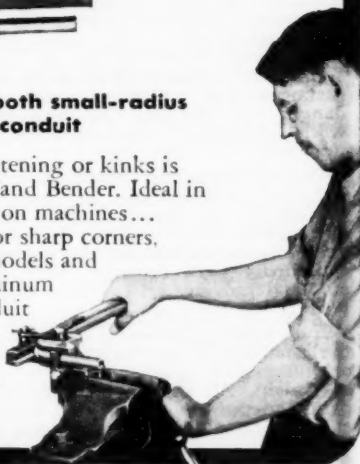


**for quickly making smooth small-radius bends in pipe, tubing, conduit**

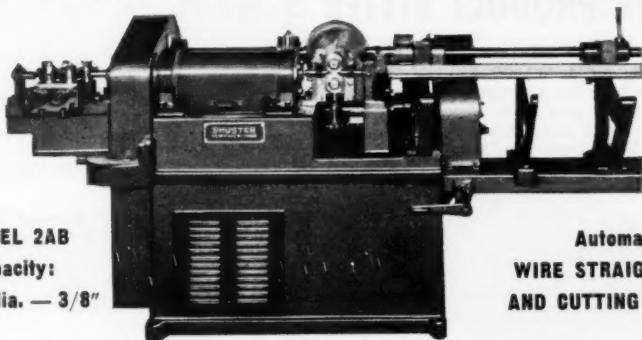
Forming small-radius bends without flattening or kinks is simple, speedy work with a GREENLEE Hand Bender. Ideal in the shop for pipe and tubing installations on machines... especially designed to form neat bends for sharp corners, nooks and other close quarters. Various models and sizes for steel, copper, brass and aluminum tubing or pipe, rigid and thin-wall conduit



GET FREE FOLDER E-207 AND BOOKLET E-201. Complete facts and prices on the Greenlee Bender line. Write Greenlee Tool Company, 202 Herbert Avenue, Rockford, Illinois.



## This New, Economical "SHUSTER" Cuts Costs AND Accurate Lengths!



**MODEL 2AB**

**Capacity:**

**3/16" dia. — 3/8"**

**Automatic  
WIRE STRAIGHTENING  
AND CUTTING MACHINE**

**Shuster Wire Straighteners are available  
for wire .025 to 11/16" diameter**

**Mfd. by METTLER MACHINE TOOL, INC.**  
19 Congress Ave.

**New Haven, Conn.**

## Trico Gravity Feed Oilers

A new series of gravity feed oilers provided with a ratchet control has been introduced by Trico Fuse Manufacturing Co., 2948 N. 5th St., Milwaukee 12, Wis. These oilers automatically supply a measured amount of lubricant to plain, stationary and anti-friction bearings. The ratchet control mechanism provides instant adjustment of the oil feed. A spring mechanism literally locks the adjustment into position, avoiding the dangers of changing the rate of feed while handling or cleaning, from vibration, etc.

The protecting cap shields the mechanism from dust and dirt and from possible damage or distortion while cleaning or wiping. An exclusive dual-purpose vent relieves suction and back pressures caused by tight bearings, high speeds, etc., and provides an overflow when the feed is set too fast.

The oil supply is clearly visible through the shatterproof plastic reservoir; there are no gaskets to leak; the oiler is light in weight. All metal parts are heavily plated to resist corrosion and for easier cleaning. The device can be easily and



quickly installed, according to the manufacturer. Trico Gravity Feed Oilers are available in 1, 2, 4 and 8 oz. capacities, and with  $\frac{1}{8}$ ",  $\frac{1}{4}$ " and  $\frac{3}{8}$ " pipe thread.

## CHICAGO "SAFETY PLUS" SOCKET SCREWS MAKE YOUR PRODUCT BETTER 4 WAYS

- **THEY'RE STRONGER**—They fasten products **MORE** securely—give a sturdier, tighter "hold".
- **THEY GO FARTHER**—Because they're stronger, they fasten tighter with fewer screws, give neater appearances with less weight.
- **MORE ACCURATE**—They're consistently more accurate in dimensions, have sharper, smoother, truer threads, start in easier the first time.
- **THEY COST LESS**—Tighter hold, plus fewer screws, plus a faster fit, means **LOWER COSTS**—in screws as well as production time.

There is a Chicago "Safety Plus" Product designed to give you a tighter, lower cost fastening for ANY heavy duty purpose.

**FIND THE TYPE YOU NEED FROM THIS LIST:**

Socket Head Cap Screws • Socket Set Screws • Stripper Bolts • Square Head Dog Point Set Screws • Socket Pipe Plugs • Keys • Hexagon Head Cap Screws, Steel and Brass • Square Head and Headless Cup Point Set Screws • Fillister and Flat Head Cap Screws • Taper Pins • Milled Studs • Semi-Finished Hexagon Nuts, Steel and Brass • Hexagon Castellated Nuts.

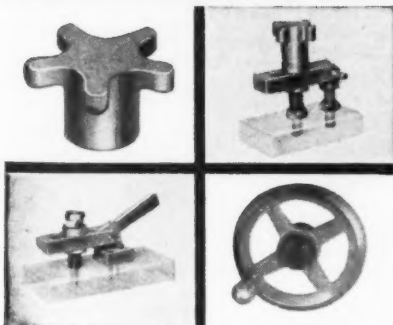
Service-conscious Industrial Supply Distributors EVERYWHERE carry complete stocks of Chicago "Safety Plus" Products. To speed delivery time, call the one nearest you.

*The* **CHICAGO SCREW COMPANY**  
2507 WASHINGTON BLVD., BELLWOOD, ILL. • Established 1872



## QUICKER SERVICE FINEST QUALITY

THAT'S WHY YOU  
"GET MORE WITH MORTON"



Having trouble getting quick delivery on your Fixture Clamps and Standard Fixture Details?

Looking for more dependable quality in Standardized Clamps for your fixtures?

Then let us prove what we can do for you!

Because of our large manufacturing facilities and complete inventory—

*We ship any catalog item the same day we receive your order.*

By heat-treating and machining to highest standards . . . by using only materials that meet the most rigid specifications . . . and by the most careful inspection—

*You get only the finest quality in Morton Products.*

Try us the next chance you have. Meanwhile—

**WRITE TODAY**  
For FREE CATALOG

**MORTON MACHINE WORKS**  
2429 Wolcott St. Detroit 20, Michigan



**MORTON**

"Get More with Morton"

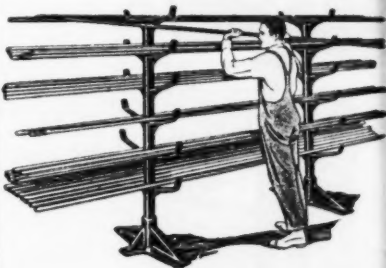
**FIXTURE CLAMPS**

and Standard

Fixture Details

## SPEEDS UP STOCK-ROOM SERVICE

The BROWN TIME-SAVING RACK saves the time previously lost end-hauling each bar of stock its entire length from the old-style, closed-side Rack, the Brown Rack requiring but a few inches of side movement. Each length, width and thickness of stock is displayed in gold-fish visibility for instant selection. Workmen waiting for stock are served without waste of time, and returned to their production machines to turn out a maximum of output.



Any time you require additional storage space, all you need do is add more units. If you want to relocate it at any time, you can do so quickly for it is unattached to the building. It is a simple, durable article made of metal in five styles. It can't burn, warp, sag or twist; depreciation is practically nil.

SEND FOR BULLETIN No. 26-M DESCRIBING—

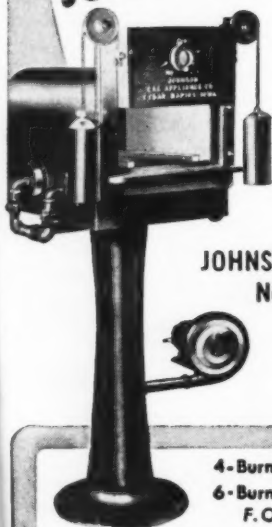
BROWN'S QUICK-SERVE RACKS

**BROWN ENGINEERING CO.**

126 N. THIRD ST. READING, PA.

RACKS • VISES • CLUTCHES • COUPLINGS

**TURN THE HEAT  
on HIGH SPEED STEELS  
Quick Acting  
JOHNSON FURNACES**



**JOHNSON Hi-Speed  
No. 130A**

**4-Burner \$295  
6-Burner \$325  
F. O. B. Factory**

**High Uniform Temperatures  
at LOW COST**

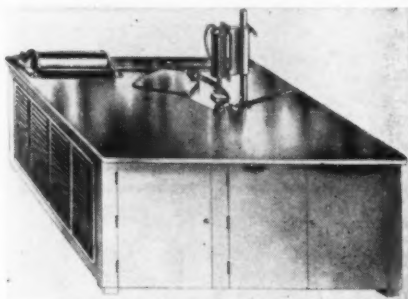
Quick Acting JOHNSON No. 130A is available in two temperature ranges. 4-Burner unit is for steels requiring 1400—2350° F., and 6-Burner unit for 1800—2400° F. Powerful, efficient burners fire under hearth assuring fast, uniform heat. Save time and gas. Easily regulated. Firebox 7x13x16½ lined with high temperature insulating refractory. Complete, ready for action with Carbofrax Hearth, G. E. Motor and Johnson Blower. Order Today!

*Write for Complete Catalog*

**Johnson Gas Appliance Co.  
570 E Ave. N. W., Cedar Rapids, Ia.**

**Drawn Shell Trimming Machine**

The Improved Model B Drawn Shell Trimming Machine will trim shells of practically any depth up to a maximum of fourteen gauge in thickness. It is a recent development of Dayton Rogers Manufacturing Co., Minneapolis 7, Minn.



A simple tooling adapter is provided for any size or shape shell up to a maximum of 12", making it possible to trim not only round shells, but irregular shells with a minimum of 1/16" internal radius. Both round and irregular shells are handled by such tooling, and only one external universal trimming cutter is needed for all trimming operations.

The work spindle is provided with a variable speed drive, making it possible to trim shells, depending upon their size and shape, at a rate of 20 to 500 per hour.

The machine not only handles all flat edge trimming operations on drawn shells, but operations such as beading, forming, flanging and other second operations can also be done with a minimum special tooling cost. The machine is provided with a 3 h.p. motor. Shipping weight is approximately 3000 lbs.

**Arrow Introduces New Live Center**

Equipped with No. 3 precision Timken Roller Bearings and designed to accommodate changeable, tapered inserts, the Arrow Live Center also features a simple adjusting screw that permits adjustment for wear. The double cone, single cup type bearings provide bearing surface for both thrust and radial loads. The tool is a recent development of Arrow Tool and Reamer Co., 422 Livernois Ave., Detroit 9, Mich.

The tapered inserts, both male and female types, are interchangeable. Available in numbers 1, 2, 3, 4 and 5 Morse Taper, the Arrow Live Center is

said to be thoroughly shop tested and its durability and efficiency proven on the job.

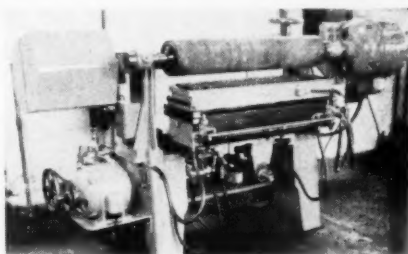
The Arrow Live Center is stated to be ideal for general purpose use and need not be restricted to large production plats. Several small shops are using the tool consistently. The Arrow Live Center is available in both general purpose and heavy duty types.

### Clair Surface Finishing Machine


A special purpose, single spindle Surface Finishing Machine is announced by Clair Manufacturing Co., 1030 S. Union St., Olean, N. Y. Developed in conjunction with hand tool manufacturers, this Model 206 machine can be equipped for either mechanical or magnetic holding.

This unit is recommended for applications where requirements approach a precision grind operation; it is suitable for a variety of small metal products, such as pliers, wrenches, flatiron sole plates, wrenches, and hinges.

Actuated by an electro-hydraulic system, this Surface Finishing Machine uses a single spindle upon which a roll 40" wide may be mounted. Automatic hydraulic "in" and "out" stroke is adjust-



able from 0" to 24", with a maximum holding and working area of 24" x 38". An air circuit provides float of buff at any predetermined uniform pressure.



**EFFICIENT — LOW COST  
PRODUCTION**

MEANS

**ROUSSELL**

**PUNCH  
PRESSES**

**WRITE FOR  
DETAILS**

**O.B.I. PRESS**

**HORN PRESS**

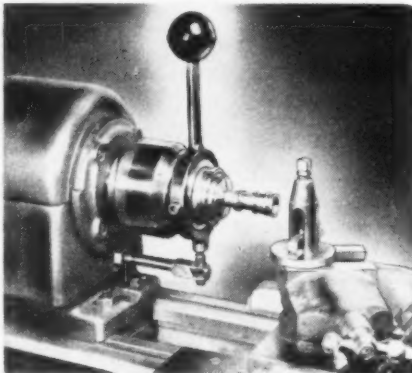
**DEEP THROAT**

**7627-33  
S. Ashland Ave.  
Chicago 20**

**SERVICE MACHINE COMPANY**

### Davos Draw Collet Chuck

The Davos Collet Chuck is an ingenious tool now being manufactured and distributed by Stallion Manufacturing Co., 2017 N. Halsted St., Chicago 14, Ill. It is used for turning, drilling, milling, grinding, deburring, polishing, and all other second operation uses. It has particular adaptability for lathes, drill presses and milling machines.



This collet chuck is stated by its manufacturer to feature greater adaptability, precision accuracy, positive gripping action, ease of operation, and no loss of time for loading and unloading. It uses standard type draw collets, and is adaptable for use with special collets upon request to the manufacturer. The installation and adjustment of the collet chuck are simple, and require no maintenance, once the unit is set up. All working parts of the chuck are of hardened and ground alloy steel.

The Davos Collet Chuck is designed for adaptability to any model lathe. Its simple opening and closing lever action permits loading and unloading while the lathe is in motion. Any type spindle stop may be used in the lathe when using the Davos Collet Chuck. The collet will not move from its permanent gripping action when in open position due to its "permanent stop" feature. Slippage is now eliminated, regardless of the material being worked on. The new chuck will not wear out the threads on the collets, since there is no forcing to tighten the collet in its gripping position.

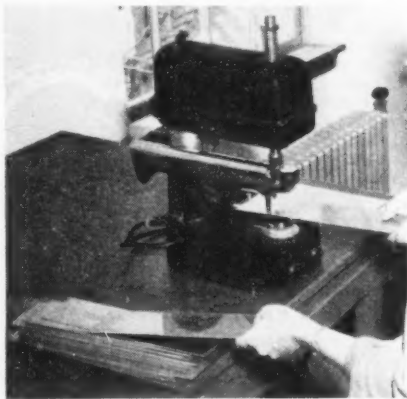
Five models are available, in collet capacities of from 1/64" to 1/2" up to 1/32" to 1 3/4" in the largest size.

### Topflight Hardness Tester and Certifier

A new automatic certifying Hardness Tester for sheet metal parts is announced by Topflight Tool Co. Inc., 116 E. Market St., York, Pa. The device is of particular interest to the aircraft industry where the new hard aluminum alloys are specified. The Top-flight Hardness Tester performs three operations, so quickly that about 70% of inspection time can be saved, the manufacturer states.

The Hardness Testing assembly includes an adaptation of a Barcol unit and can be set for the desired hardness. By means of a conversion chart, Brinell, Rockwell or Vickers numbers can be certified.

In operation an impressor needle moves up and down on an anvil. Pieces to be inspected are fed between the needle and the anvil and when the point contacts the part, a dial reading is visible and a green light flashes if the piece is of the required hardness. A stamp then automatically certifies the piece, and at the same time a counting device registers the total pieces inspected. When a metal part is not of the required hardness, the green light will not flash, the stamping die will not function, and the counter will not register.



The whole operation is automatic, except feeding the parts to be inspected, which is done manually. Operators need not be skilled, and no special training is necessary. Skilled labor can be released from inspection, and six unskilled operators can turn out as much work as twenty trained inspectors could do by other methods, according to the device's makers.

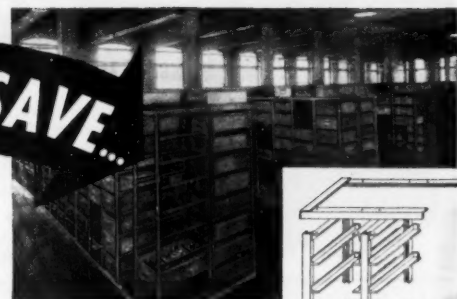
# RACK 'EM and SAVE...

**SAVE SPACE** Sterling Racks utilize rent-free air space . . . keep your parts and tools neat and orderly.

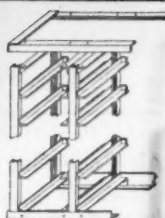
**SAVE TIME** Materials "filed" in Sterling Racks are always available — upper and lower boxes equally accessible.

**SAVE MONEY** Sterling Racks cost you about 1/3 less per opening than individual racks.

Made to fit your present shop boxes or boxes supplied. Available in five section units of rigid construction—Prompt Delivery. Write today for literature and prices.



Sterling Racks and boxes in modern stockroom. These five feet sections are convenient for shipping, assembling, and relocating.



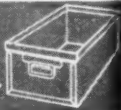
Drawing shows how top and bottom frames are bolted to uprights. Racks are shipped knocked-down.

Sterling Factory Equipment Co., 187 Charles St., Providence, R. I.



## Sterling

Quality Handling & Storage Equipment



## Dependable MEASURING & CHECKING EQUIPMENT

and Now

HAND WHEELS, KNOBS, HANDLES

**Cadmium Plated**

Non-rusting — good looking



STRAIGHT and OFFSET TYPE



CAST IRON

READY TO DELIVER

SOLID MACHINE HANDLES



MALLEABLE IRON

We also build jigs, fixtures, special tools and machinery. Send us your blueprints.



UNIVERSAL ANGLES  
In 10 sizes, ranging from  
4 x 3 1/4 x 5 and up.

BOX PARALLELS  
In 15 sizes, ranging from  
3 x 4 x 12 and up.

SLOTTED ANGLES  
In 19 sizes, ranging from  
4 x 9 x 5 and up.



SURFACE PLATES  
Over 50 sizes, ranging from  
7 x 7 1/2 to 96 x 192.

Send for Complete Catalog

## MACHINE PRODUCTS CORPORATION

6771 E. McNICHOLS ROAD

DETROIT 12, MICHIGAN

**MILWAUKEE****DIE FILERS  
PROFILE GRINDERS****Embody Many Improved Features**

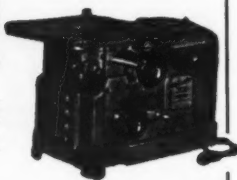
... features that result in higher efficiency, improved operating convenience and, most important, lower costs in your filing, sawing, lapping and grinding operations.

Write for Illustrated Bulletins

**RICE PUMP & MACHINE CO.**

224 N. Milwaukee Street

Grafton, Wisconsin

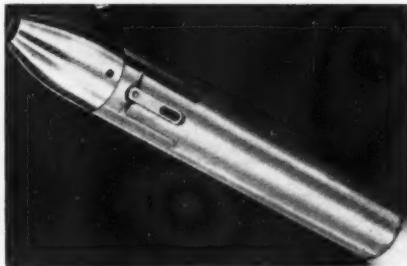
**Air Gage Plug Checks Rough-Surfaced Bores**

A newly designed contact gaging plug for P & W Air-O-Limit Internal Comparators permits air gaging of rough-surfaced bores with a high degree of accuracy previously not obtainable. It is a recent development of Pratt & Whitney, Division Niles-Bement-Pond Co., West Hartford 1, Conn.

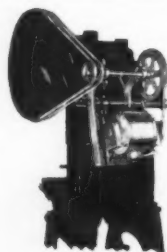
The rate of air flowing through the gaging plug is controlled by carbide buttons mounted on spring leaves. The buttons are depressed by contact with the work during gaging, and impede the escape of air from small nozzles within the plug. The resultant change in line pressure causes the Air-O-Limit indicator to show the exact variation from basic diameter in decimal terms.

The contact plug is especially suited for diamond boring and reaming operations where finishes exceed 50 micro-inches, a degree of roughness which prevents the use of conventional air gaging plugs. (Conventional plugs jet the air directly against the surface of the bore, and pressure is regulated only by the rate at

which air escapes through the clearance between bore and plug. In this type of gaging, a relatively smooth bore is prerequisite to accurate readings.)



These new contact gaging plugs can be furnished with either an easy-entry "bullet" nose or a pilot nose which provides for fast and accurate operation. A unique design feature permits adjustment for setup and wear of the carbide contact gaging buttons. For further wear resistance, the plugs may be obtained with chromium plating or with carbide wear strips.

**Put the "PUNCH" in Punch Presses  
with a MODERN Motor Drive**

No need to use slow speed or geared motors and small pulleys to slow down your presses.

Utilize standard 1750 RPM motors.

"V" Belt Drive absorbs shock. Operate smoothly, silently, efficiently, economically.

Write to Dept. BB for complete details.

**MODERN MOTOR DRIVES DIV. of The Nichols Eng. Co.**  
Dept. BB, 3818 W. GRAND AVE. CHICAGO 51, ILL.





For blowing chips from work — For cleaning out hollow sets, machine recesses and tee slots — For drying parts before inspection and for many similar uses, Air-O-chek is the Air-gun.

Write for details.

**AIR-WAY PUMP & EQUIPMENT CO.**  
1054 N. Kilbourn Ave. Chicago 51, Ill.

## EASY READING

Rivett transparent packaging permits inspection of collet style and size without removal from carton. A time-saving feature eliminating stock room headaches.

Rivett Draw-In Collets are checked 25 times against master gauges! Work is guaranteed to run "dead true" at the collet mouth. Stocked in all standard styles.



Write for Bulletin 100  
**LATHE & GRINDER, Inc.**  
Brighton 35, Boston, Mass.  
Dept. MBBA2

**RIVETT**

For More Precision Work  
RELY ON RIVETT, The Master Craftsman's Master Tools

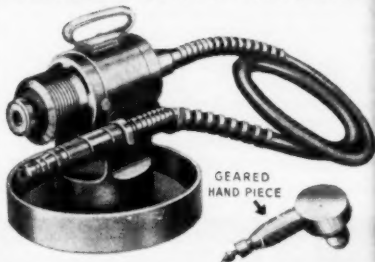
**New Universal Joint!**

"...The Ball & Socket Joint with the Toggle Action"

*Write For Folder!*

**B. M. ROOT CO.**  
YORK, PENNA.

## JEMCO FLEXIBLE SHAFT MACHINE



Used for a wide variety of work; grinding routing, carving, filing, burring, buffing, polishing, sanding and wire brushing. It is very useful for making wood and metal patterns, dies, tools and also in regular manufacturing work.

The 1/3 h.p. motor operates on 110 or 220 volts — a.c. or d.c. current. (Specify voltage when ordering) and gives speeds up to 10,000 r.p.m. By using the "geared hand piece" these speeds may be extended to 23,000 r.p.m.

Write Us For Details

**JEFFERSON ENG. & MFG. CO.**  
269 Walker Street Detroit 7, Mich.

## King Boring Mill with Contouring Attachment

This 52" Vertical Boring and Turning Machine with hydraulically controlled tracer attachment is now establishing new records for rapid production in the plant of a large manufacturer of jet engines. The machine was designed and constructed by King Machine Tool Division of American Steel Foundries, 1150 Tennessee Avenue, Cincinnati 29, Ohio.

In addition to the tracer attachment, this versatile machine is equipped with a swivel turret head and special 4-way tool block on the left-hand ram head. In one machine is combined automatic contouring and manual roughing with automatic depth control, and in addition, by shifting one lever, the contouring attachment can be disconnected and the machine can then be used as a standard vertical boring mill. The basic design and specifications are flexible and can be modified to meet individual requirements.

This mill is heavy and rugged in construction, with the extra weight and rigidity that assures a dependable accuracy and maximum stock removal at the highest speeds within the range of modern cutting tools. All controls are conveniently located at front of the machine, easily accessible to the operator. On-the-spot precision adjustments in standard boring mill operations are made



quickly and easily from the operator's normal working position.

Other advantages claimed include greater power, a wider range of feeds and speeds, and the widest available size range in the vertical mill field—ten sizes, 30" to 144".

"10 Sizes — Solve 'Most Any Problem'"

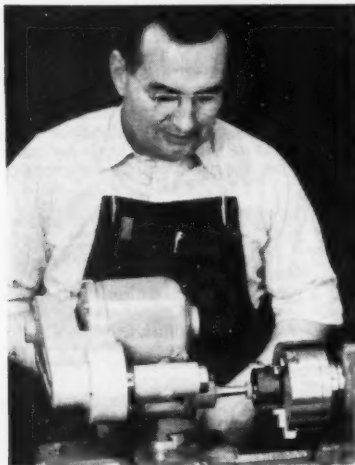
**HIGH SPEED**  
**Cold Riveters**

HIGH SPEED Hammer Co., Inc. 211 Norton St., Rochester 21, N.Y.



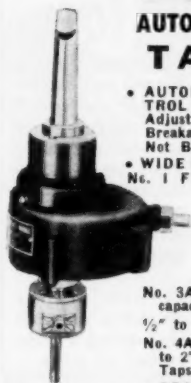
## Internal Grinding Attachment for Lathes

A new Precision Grinder has been developed by South Bend Lathe Works, 426A E. Madison St., South Bend 22, Ind., to meet the need for an internal grinding attachment with sufficient power to maintain a more constant wheel speed under varying loads and to prevent stalling under comparatively heavy cuts.



The South Bend Internal Grinder is powered by a standard type, constant speed, continuous duty 1/6 h.p., 3450 r.p.m., a.c. motor. The motor is compound belted, through an intermediate shaft, to obtain a quill spindle speed of 30,000 r.p.m. Tests have shown that less than 1000 r.p.m. drop in spindle speed occurs when taking cuts as heavy as .003"

## DORMAN AUTOMATIC REVERSE TAPPERS



- AUTOMATIC TORQUE CONTROL . . . One Minute to Adjust . . . Prevents Tap Breakage . . . Operator Need Not Be Skilled
- WIDE RANGE TAP CAPACITY  
No. 1 FRICTION DRIVE TAPPER  
—capacity No. 2-56 to 3/8" in Steel  
1/2" in Aluminum.  
No. 2B POSITIVE TAPPER—capacity 3/8" to 3/4" in Steel
- No. 3A POSITIVE TAPPER—capacity 1/2" to 1 1/4" in Steel, 1/2" to 3/4" Pipe Taps.
- No. 4A TAPPER—Capacity 3/4" to 2" in Steel including Pipe Taps.
- PRODUCTION THREADERS with Round Split . . . Button . . . Acorn Dies
- IMMEDIATE DELIVERY

Price from \$44.00. Write for Bulletin.

### THRIFTMASTER PRODUCTS CORPORATION

Division of Thomson Industries, Inc.

1020 N. PLUM STREET, LANCASTER, PA.

STANDARD UNIVERSAL ADJUSTABLE AND SPECIAL FIXED CENTER DRILLHEADS

Reprints of previously published special machine tool reports are still available in limited quantities. Tools featured to date include: May: Thread Rolling; June: Power Press Brakes; July, September, October: Milling Machines; November: Honing, Lapping, Superfinishing; December: Automatic Screw Machines; January: MAPI Replacement Formula.

## HIGH SPEED Cold Riveters

Thousands of now happy users originally started with us by submitting sample assemblies of their riveting work. Our complete line of riveters gave us a choice for the best economy and results.

Without charge we studied their particular problem, and returned the assembly properly riveted with complete analysis, recommendations and quotations.

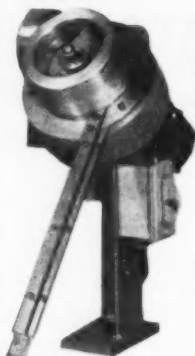
It's a FREE service, that may save you time, materials and spoilage—and speedup production. Why not write us?

We also manufacture High Speed Drilling Machine, Model R53 for sensitive, precise and accurate drilling.

HIGH SPEED Hammer Co., Inc.

211 Norton St., Rochester 21, N.Y.

## Reynolds **AUTOMATIC HOPPER FEEDS**



Eliminate costly handling operations by delivering part automatically to work position. Parts poured into the motorized hopper are arranged and fed as required.

Several types available suitable for feeding a wide variety of parts.

Send sample of part to be fed when writing for quotation.

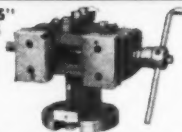
**COOK & CHICK CO.**  
640 S. MILLER ST. CHICAGO 7, ILL.

HUNDREDS OF PLANTS USE THEM  
TO SHORTEN SET-UP TIME  
SAVE ON TOOLING COST... AND  
S-P-E-E-D - UP PRODUCTION!

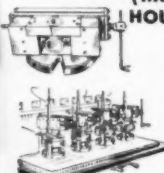


"JOHN'S"  
DRILL JIGS

For  
Drilling  
Tapping  
Boring  
Milling  
Grinding



ONE USER TAPS 1300  
(Individual Pieces) per  
HOUR with a 6-inch Jig



HEUSER JIGS give you  
precision split-second  
centering; fast, easy  
loading and unloading;  
rigid clamping of  
work and plenty of  
chip room.

Priced so even the  
smallest shop can  
afford them.

3 Std. SIZES  
6", 8", 14"  
Universal  
jaws handle  
diameters  
between  
1/8" and 3/4"

Manufactured by  
**HEUSER MFG. CO.**  
1638 No. Paulina St.  
Chicago 22, Ill. U.S.A.

on a side in hardened steel. The power loss is negligible.

The grinding wheel and intermediate shaft spindles run on high precision, high speed ball bearings which require no adjustment. Lubrication is supplied from built-in oil wells. Oil is effectively sealed in the spindle units, and dust is sealed out in such a way that the bearings will retain their precision indefinitely.

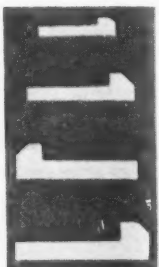
Four arbors are supplied, the longest permitting a hole 3 7/8" deep to be ground when using a 1-inch wheel. Four grinding wheels are included for these arbors, having 1/4" face; 1/4" bore; and 3/8", 3/4", 7/8", and 1" diameters. In addition, a 1/8" chuck is supplied, so that the various sizes and shapes of mounted grinding wheels may be used and holes down to 1/8" may be ground. Any grit and type of high speed wheel having a 1/4" arbor hole or mounted on a 1/8" shaft may be used as required for the material to be ground.

### Correction

In the December issue the advertisement for the Grobet File Co., 421 Canal St., N. Y., illustrated their needle file cases in red. The actual color of the boxes is a clear blue plastic and attention is here drawn with apologies, to the color error in the advertisement.

## Specify **STANDARD**

- Taper Pins
- Machine Keys
- Woodruff Keys
- Machine Racks



Yes, "Specify Standard" and you are certain of quality products to meet your production requirements. Your needs for the above items can best be served by Standard whose 2 plants (Beaver Falls, Pa. and Hammond, Indiana) are equipped to serve you. Write today for your free copy of Standard's catalog with specifications.

**STANDARD STEEL SPECIALTY  
COMPANY**

BEAVER FALLS

PENNSYLVANIA

## President for 1951

The election of J. Calvin Brown, engineer and patent attorney of Los Angeles, as president of The American Society of Mechanical Engineers for 1951, was announced Nov. 27, 1950, at the Society's 71st annual meeting in the Hotel Statler, New York. Mr. Brown took office at the conclusion of the meeting on Dec. 1, together with four regional vice presidents and two directors-at-large who were also elected.

### BURR KEYSEATERS



Mill keyways in the run or on the ends of shafting already erected—save money on alteration, erection, and repair work.

Made in 4 sizes, for hand or motor operation.

Write for Bulletins and prices.

JOHN T. BURR & SON  
429 Kent Ave.,

Brooklyn, N.Y.

## Heavy Duty • Bench Type ENGRAVING MACHINE

Interchangeable heads for engraving, electrical marking, and acid etching . . . available for all models. Also Panto engraving cutters, cutter grinders, master copy type, endless belts and accessories.



The PANTO  
MODEL UE-3  
SEVERAL OTHER MODELS AVAILABLE

Write for  
illustrated  
catalog

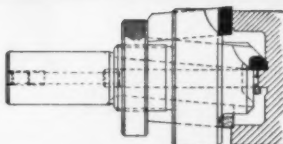
H. P. PREIS ENGRAVING MACHINE CO.

647 STATE HIGHWAY 29 • HILLSIDE, N.J.

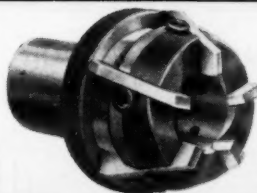
February, 1951

# GENESEE

## COST CUTTING MULTIPLE OPERATION TOOLS



HOLLOW MILLS - UNDERCUTS - FACES  
CHAMFERS - BORES & SPOT DRILLS



STD. 0-2" CAPACITIES  
H.S.S. or  
T.C.T. Blades  
10 STYLES

ADJUSTABLE HOLLOW MILLS



STD. 1 1/2 to 4" DIAMETERS  
INTERCHANGEABLE  
PILOTS H.S.S. or  
T.C.T. BLADES

FACING AND COUNTERBORING TOOLS

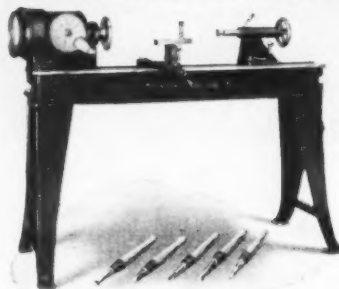
Let our Engineering Dept. solve your Production Tool problems. Over 40 years of Know How at your disposal.

Write for Catalog 48-H

GENESEE MFG. CO., INC.  
ROCHESTER 4, N. Y.

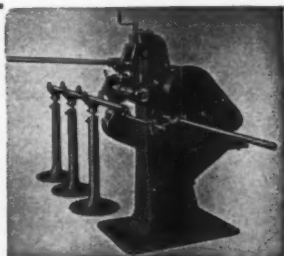
- ADJUSTABLE HOLLOW MILLS
- FACING AND COUNTERBORING TOOLS
- SPECIAL PRODUCTION TOOLS

## "OLIVER" METAL SPINNING LATHES



This Lathe swings 12" over a 4' bed. Has rigid, heavy bed for accurate work. Heavy duty ball bearing headstock is adjustable from 800 to 2750 r.p.m. Live tail center. Can also be used for turning wood and light cuts of metal. Write for Bulletin 159-M.

**OLIVER MACHINERY COMPANY**  
GRAND RAPIDS 2, MICH.



## *Faster* TUBE & PIPE CUTTING

Steen High-Speed pipe, tube and column cut-off machines embody unique design and rigid construction features to greatly step up cut-off operations. Available in three sizes to cut diameters  $\frac{1}{8}$ " to 3";  $\frac{1}{8}$ " to 6"; 3" to 12".

WRITE FOR CIRCULAR TODAY

**Continental Machine Co.**  
1954 Maud Ave. Chicago 14, ILL.

## O.T.C. Flare Nut Wrenches

Two new Flare Nut Wrenches which increase the range of these tools to  $1\frac{1}{4}$ " are announced by the Owatonna Tool Company, 382 N. Cedar St., Owatonna, Minn. These wrenches are said to be ideal for fuel, hydraulic and gas lines on diesels, tractors, refrigeration units, etc.

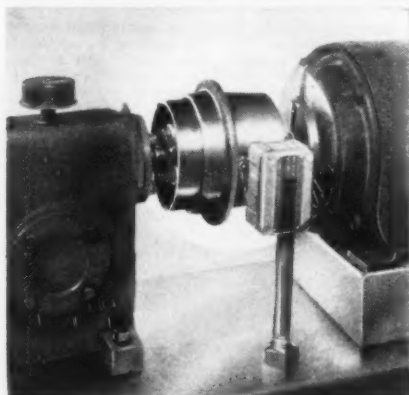


The wrenches are made with hex openings to provide a better bite, and to prevent turning the corners on soft brass nuts usually found on copper lines. They are drop-forged from high alloy steel, fully heat-treated with chrome plated finish. No. CS-2428 is provided with  $\frac{3}{4}$ " and  $\frac{7}{8}$ " openings; No. CS-3236 has 1" and  $1\frac{1}{8}$ " openings.

Three other wrenches of the Flare Nut type, covering the smaller automotive sizes are also available. No. CS-1214 with  $\frac{3}{8}$ " and  $7/16$ " openings; No. CS-1618 with  $\frac{1}{2}$ " and  $9/16$ "; and No. CS-2022 having  $\frac{5}{8}$ " and  $11/16$ " openings.

## Automatic Power Shut-Off Device

A new automatic device for machine tools, conveyors, etc., instantly shuts off the power when an overload due to any cause occurs; it resets itself automatically,



preventing sheared pins, and saves the time normally required to replace them. The new Cut-Out Coupling is manufac-



tured by Anchor Steel & Conveyor Co., 6906 Kingsley Ave., Dearborn, Mich. It combines the features of a flexible coupling with the torque sensitive protection of the widely used Anchor Cut-Out Pulley.

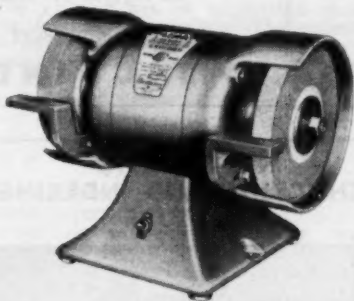
Anchor Cut-Out Couplings are furnished in two sizes and with working ranges from 10 to 2000 inch pounds torque. An available catalog (50A) gives the many possible applications, formulas and description of the Cut-Out Coupling.

### **Lima 6" DeLuxe Utility Grinder**

The Lima Electric Motor Co., Dept. AA98, Lima, Ohio, announces its new 6-inch Model A DeLuxe Utility Grinder, for use in tool rooms, machine shops, manufacturing plants, etc.

Features of this new grinder include: dynamically balanced rotors; integrally cast wheel guards; adjustable tool rests (may be tilted for angular grinding); fast-grinding, long-wearing abrasive wheels (furnished as standard equipment); heavy-duty, Off-On toggle switch in base; cast iron base (rubber mounted and drilled for permanent mounting); 7½ foot, three-conductor, rubber covered cable with non-breakable plug, (U. L. Approved).

Specifications include: fast starting, ¼ h.p., 3450 r.p.m. Lima motor of dust proof construction, single phase, a-c, 60 cycle, 115 or 230 volt (single voltage only). Also available for 2 or 3 phase, a-c, 60 cycle, 220 or 440 volt operation. Prelubricated sealed ball bearings; 6" diameter x ¾" face wheels, (one coarse and one fine grit).



The new Model A Lima DeLuxe Utility Grinder is available in either Standard Red—for easy locating in large shops or Machine Tool Gray.

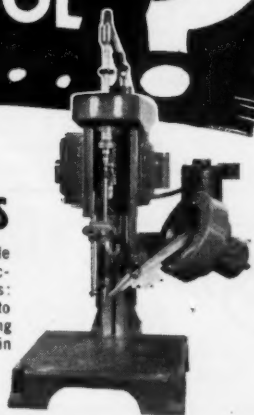
## **WHAT SHOULD A PRODUCTION TOOL DO FOR YOU ...**

**It Must Amortize Itself Rapidly, then  
Pay Dividends in Increased Production ...**

### **DETROIT POWER SCREWDRIVERS**

replace the slow, dragging tempo of hand methods with the almost incredible speed of their mechanical operation, resulting in tremendously increased production, greater economy and stepped-up profits. They drive all types of screws: standard and special heads, Phillips heads and slotless heads. Driving time one to two seconds per screw ... Uniform tension ... No marring of heads or stripping of threads. Screws always in sight of operator. Let our experience as specialists in assembly problems serve your interests.

*Send for Catalog and further details*



**DETROIT POWER SCREWDRIVER CO.**

**2809 W. FORT ST.  
DETROIT 16, MICH.**



## PORTABLE METAL BRAKES

Well balanced, easily operated sturdy construction. Equipped with two screw type clamps to afford easy bench mounting, also other styles—literature on request. **DEALERS WANTED.**

F.O.B. DETROIT — NO C.O.D.'s

**G & S MACHINE SHOP**

**24" BRAKE only \$60.00**  
Capacity 20 Gauge CRS

**18" BRAKE only \$47.00**  
Capacity 18 Gauge CRS

**10" BRAKE only \$12.00**  
Capacity 18 Gauge CRS

DEPT. A-2, 8700 GRINNELL  
DETROIT 13, MICHIGAN

## AUTOMATIC CHUCKING AND INDEXING FIXTURE



- 1.—1800 light cuts per hour.
  - 2.—Either horizontal or vertical position.
  - 3.—Collets changed instantly.
  - 4.—Automatically knocks piece out.
- Model D—Ratchet indexing only—1" cap.  
Model E—Both degree and ratchet indexing  
—Capacity up to 1".  
Model F—Both degree and ratchet indexing  
—Capacity up to 2 1/4".  
Write for Folders

J. W. DEARBORN • Ansonia, Conn.

**DESPITE GENERALLY  
RISING PRICES —  
increased  
PRODUCTION FACILITIES**

*permit us to*

**CUT PRICES  
from 12 to 15%**

*on our complete line of*

**MARVECO  
LIVE CENTERS**

*New prices retroactive to  
Oct. 15, 1950*

**MARVEL TOOL & MACHINE CO.**  
1096 N. River Rd. • St. Clair, Mich.

## Small END MILLS that do a BIG JOB MICRO MINIATURES

Precision Ground from SOLID

**LONGER LIFE — FASTER CUTTING  
STRENGTH**

WE SPECIALIZE IN SMALL SIZES

Fast Delivery on Your Special Requirements

Write for Catalog

### THE SECRET

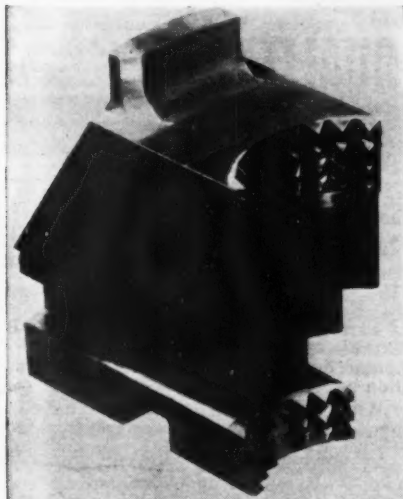
of their durability and long life lies in our method of grinding which produces a smooth, unbroken cutting edge. No saw tooth edge to load-up and break-down.



**WOODSON TOOL CO. 4811 1/2 LENNOX BLVD. • INGLEWOOD, CALIFORNIA**

## Colmonoy Tipped Chuck Jaws

Illustrated below is one of the complete chuck jaws with the newly announced Colmonoy cast inserts developed by Diamonds and Tools, Inc., 19345 John R. St., Detroit 3, Mich.



With the development of these cast inserts for chuck jaws, it is now possible to get longer life with greater accuracy than with tool steel jaws, according to the manufacturer. Also, when the inserts become worn, new ones can be set into place very easily. The Colmonoy is silver soldered to the jaw, thus it is only necessary to heat the jaw, remove the old insert and replace it with a new one. Another important advantage is the elimination of heat treating. These inserts may be secured separately, or as a complete jaw with the Colmonoy inserts ground in place.

## New Hermes Precision Cutter Grinder

An accurate precision cutter grinder for sharpening engraving cutters has been made available by New Hermes, Inc., 13-19 University Place, New York 3, N. Y., world's largest manufacturer of portable engraving machines.

Users of New Hermes engraving equipment may now sharpen the points of their gravers true to center right on the premises. Convenience and ease of operation are assured the most inexperienced workers, so simple and practical is the design of the grinder.

The index unit on the spindle allows the operator to grind any desired cutting profile with proper angles and clearance. Two, three and four fluted cutters can also be ground and sharpened by using the attached indexing plate. The cutter grinder is equipped with a cool cutting grinding wheel. A special diamond wheel may be ordered for sharpening carbide tipped engraving cutters.

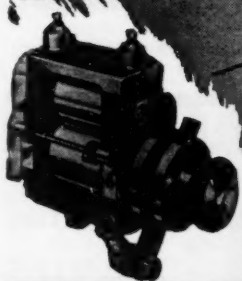
The grinder has an adjustable clamp head for radius grinding. The rotating base of the cutter head has a 140° graduation. The cutter feed dial is graduated in 1/1000 inches and is powered by a 1/6 h.p. Universal motor of 115 volts, with a speed of 6,000 r.p.m. Length of the unit is 11", height 6 3/4", and width on the base is 5 3/4".

The Herman Stone Co., Dayton, O., manufacturers of granite surface plates, doubles its production capacity with completion of a new production plant, having floor space of approximately 11,000 square feet.

The new structure features a center drive-through to expedite handling of raw materials and finished products. Large bays at either side accommodate a completely new installation of modern production machinery.

## A UNIVERSAL FAVORITE: ROLL FEED \$89.50

A truly remarkable unit which is a universal favorite and priced within your budget. Quality built for long dependable service. Models available in all sizes of power presses.



Write today for  
informative literature

## ROLL FEEDS CORPORATION

Pawtucket

Rhode Island

Builders of Electric Precision Die Millers

# CHASERS

**STANDARD:  
OR MADE TO YOUR SPECIFICATIONS**

**To Fit All Types  
of Die Heads**

**QUALITY  
CHASERS  
Sell For Less**

**QUALITY CHASER  
OFFERS YOU:**

1. Master Workmanship.
2. Top Performance.
3. Longer Threading Life.
4. Standard sizes from stock.
5. Specials on good delivery.



**QUALITY**

**CHASER CO.**

Several Good Territories  
Are Available Including  
St. Louis, Mo.  
Cleveland, Ohio  
PHONE: Lincoln 4-7704  
**WRITE FOR CATALOG**

24000 Stephenson Hwy  
HAZEL PARK, MICH.

## Heppenstall Develops New Die Steel

"Prestem" (pat. pending), a newly developed hot working die steel, is now being marketed in the form of solid press dies, insert dies, upsetter dies and punches, by Heppenstall Co., 4620 Hatfield St., Pittsburgh 1, Pa.

According to the manufacturer, "Prestem" will be particularly useful as a solid die or insert die for drop forge plants making press and upsetter forgings for the automotive, aviation and farm implement industries.

The new hot working die steel possesses the physical characteristics of developing a minimum amount of heat checking (the cause of fatigue failure), and yet resists the plastic flow of hot metal during press forging operations. These attributes are said to be based on a precipitation hardening phenomena where "Prestem" picks up temperature and develops an increase in surface hardness.

Other characteristics include a ready machinability at comparatively high hardness, a high impact resistance, and an ability to be water cooled during press forging operations.

Heppenstall Co. is marketing "Prestem"

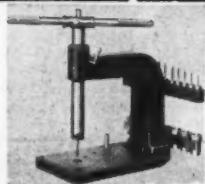
in three general hardness ranges. "A" hardness has a 2.95-3.10 Brinell B. D. with a 41-45 Rockwell "C". The "B" hardness of "Prestem" has a 3.15-3.30 Brinell B. D. and a 36-40 Rockwell "C". The steel is also distributed in a pre-hardened, untempered condition, having a hardness range of 3.10-3.25 Brinell B. D. (38-42 Rockwell "C") for customers' tempering after machining to a precipitation hardness beyond machinability.

When dies are tempered by the customer, says Heppenstall, a hardness range of 2.90-3.00 Brinell B. D. or 45-48 Rockwell "C" will result, when tempered at 950° F. If tempering is accomplished at 1050° F. the hardness range will be 2.70-2.85 Brinell B. D. and 49-52 Rockwell "C".

## Syntron Develops Coolant Screener

Syntron Company, 300 Lexington Ave., Homer City, Pa. reports a new model in its line of small Vibratory Feeders—a unit for desludging machine tool coolant liquids. A large manufacturer was confronted with the problem of steel filings and abrasive grains filling up the coolant tank of the grinders, so had Syntron develop this model SF-01 Vibratory Screen-

## Lassy TAPPERS



**UNIVERSAL  
TAP AND DIE  
GUIDE FIXTURE**

3 Sizes  
Capacity No. 5 to 1"  
Pipe taps to 3/4"  
Threading die adapt-  
ers to 1 1/2" O.D.

Immediate delivery.

**LASSY TOOL CO., Plainville, Conn.**

## and WORK HOLDERS



Quick, accurate set-  
ups on Lathes, Grin-  
ders, Jig Borers,  
Milling Machines and  
Drill Presses. Ac-  
curate to .0002 in 3"  
Hardened steel "V"  
insert. Also made  
with quick acting  
clamps for production  
work.

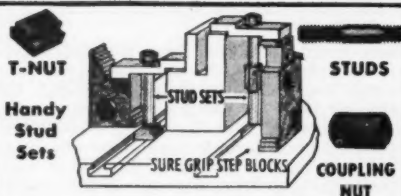
# CAMS

Our ROWBOTTOM cam cutting facilities are at your disposal for your cam requirements.

We solicit your inquiries.

**BLOOMFIELD TOOL CORP.**

38 FARRAND ST. BLOOMFIELD, N. J.



Send for Bulletin B for complete Sizes & Prices

**TIETZMANN TOOL CORP.**

315 N. Main St., Englewood, Ohio



## WADE ENVELOPES

protect  
Shop Orders, Drawings,  
Blueprints, etc.

Made in three styles, transparent, fibre, and metal backs. Non-inflammable acetate windows. Special style or size to order. Write for details.

## WADE INSTRUMENT COMPANY

Dept. M, R.F.D. No. 1 Chardon, Ohio

## DUAL CROSS and ROTARY FEED

### PALMGREN Rotary, Index MILLING TABLE

No. 83 Only \$49.50



Has 8" table, 360° movement and 4" cross feed travel. Adjusting wheels and dials graduated in degrees and thousandths. Slotted for bolting to table. No. 82 without rotary feed \$39.75. Write for Circular No. 354.

**CHICAGO TOOL AND ENGINEERING CO.**  
8384 South Chicago Ave. Chicago 17, Ill.



## KING PORTABLE BRINELL

for all HARDNESS TESTING, Throat 4", Gap 16", Wt. 27 lbs. — ACCURATE

Puts actual load of 3000 KG on 10 mm. ball. Test head removable for testing very large parts.

### ANDREW KING

521 Broad Acres Road  
Norberth, Pa.



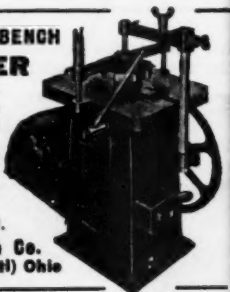
## READING BENCH KEYSEATER

Portable — move directly to job, a time saver for both small and large shops.

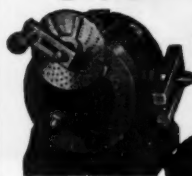
3 1/4" stroke; adaptable for other work. Low first cost — prompt delivery.

Good dealers wanted.

**Reading Machine Co.**  
Reading (Cincinnati) Ohio



## CARROLL DIVIDING HEADS



Catalog  
on  
Request



3 SIZES - 4 MODELS - 6" to 12"

**TROYKE MFG. CO.**

4422 APPLETON ST. CINCINNATI 9 O

## Want the best?



Specify **ACE**  
DRILL BUSHINGS

- 3/4 MILLION BUSHINGS IN STOCK is your assurance of prompt service
- WEST COAST AERO TOOL'S REPUTATION is your guarantee of highest quality
- HIGHEST QUALITY TOOL AND ALLOY STEELS provides extreme durability and longer life
- PRECISION MADE — LIGHT-WAVE TESTED for .0003 maximum tolerance

AFFILIATE  
MEMBER  
A.S.T.E.

**ACE DRILL BUSHING CO.**

DIVISION OF WEST COAST AERO TOOL CO.

1401 MOUNTAIN AVENUE HO 9-8253 LOS ANGELES 37



MACHINISTS—TOOL AND DIE MEN—SHEET METAL WORKERS—ETC.

## FREE SAMPLE BLUE LAYOUT DOPE

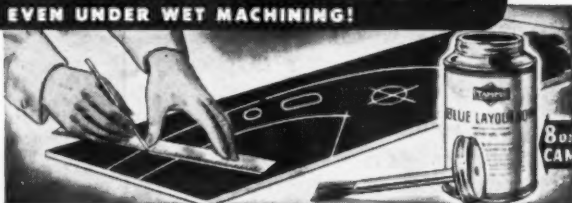
STAYS PUT EVEN UNDER WET MACHINING!

Speeds layout on all metals. Dries fast. Oil resistant. Won't chip, crack or flake off. Comes in handy 8 oz. brush-in cans, pts., qts., drums. Order now!

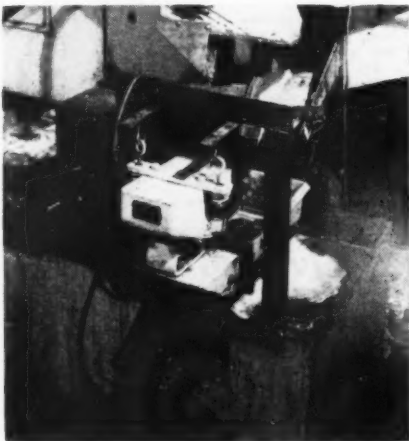
**TAMMS INDUSTRIES, INC.**

(formerly Tamms Silica Co.)

228 N. LaSalle St., Chicago 1, Ill.



ing Feeder for installation on the edge of the coolant tank, as pictured below.



The used coolant from the machine tool was run through the vibrating screen which caught the steel filings and abra-

sive grains and fed them as sludge into a receptacle, with the desludged and clean coolant liquid going back into the storage tank for using over again.

The use of this Screening Feeder effected a considerable savings by eliminating a 30-minute period at the end of each shift that had been required to enable the operators to clean out the coolant tank for the following shift. It was estimated that the new feeder was removing approximately 90% of the sludge from the coolant.



### DRILL THESE HOLES

BY A QUICK, EASY, INEXPENSIVE METHOD  
Your business letterhead will bring literature

**WATTS BROS. TOOL WORKS**  
Wilmington, Pa.



## THE MULTIFORM BENDER

PRODUCES—Springs, Stampings,  
Wire Forms, Brackets, Bus Bars,  
Clamps, etc. AT A PROFIT.

*No Special Tooling*

**J. A. RICHARDS CO.** KALAMAZOO MICHIGAN



## PRECISION BUILT MACHINIST VISE

Enclosed design prevents chips and dirt from entering internal parts. The balanced motion of a fine threaded spindle, moving freely in an ingeniously anchored sleeve type nut, eliminates dead motion and strain on moving parts. Head moves in precision broached keyway. Complete size range of bench and combination pipe vises. Before you buy, write for our descriptive catalog and give us the name of your preferred distributor.

**WILTON TOOL MFG. CO.**  
925-E Wrightwood Av., Chicago 14, Ill.

**WILTON**  
THE FINEST NAME IN VISES



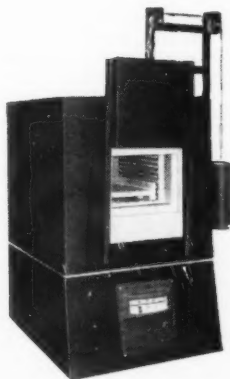
**5 YEAR GUARANTEE**



**"C" CLAMPS**  
OF PEARLITIC  
CASTINGS — tensile  
strength up to 80,000  
P. S. I. — lower in  
price than forged  
clamps yet equally  
efficient.

*Designed for*

**TOOL ROOM EFFICIENCY**



### HUPPERT MODEL 11 FURNACE

Years of low-cost operation on heaviest schedules in tool and die shops, and laboratories have dictated these features for your economy. Huppert Automatic Temperature Control for accuracy to 2000°F.— Huppert Multi-Insulation, Heavy-duty Kanthal elements, and fully enclosed contacts. Counterweighted, tight-sealing door. I.D. 8" x 6" x 12". 220 V AC, 4½ KW max. load.

**Model 11ACB - \$380.00 Complete**  
**Model 11 (Without Temp. Control) - \$240.00**

#### OTHER CAPACITIES

	I.D.	FAHR.	KW	PRICE WITHOUT TEMP. CONTROL
Model 12	8"x6"x12"	2000°	6	\$320.00
Model 12A	8"x8"x18"	2000°	9	\$400.00
				PRICE WITH TEMP. CONTROL
Model 12ACB	(Same specifications as Model 12)			\$430.00
Model 12A-ACB	(Same specifications as Model 12A)			\$560.00

All models can be supplied for 2300° F. operation for small additional cost.

**WRITE FOR DETAILS**

**K. H. HUPPERT COMPANY**

6845 Cottage Grove Avenue Chicago 37, Illinois  
Manufacturers of Electrical Furnaces and Ovens

# Empire LIVE CENTERS

• ACCURATE • VERSATILE  
• ARE • HEAVY DUTY



THE TAPERED  
SEAT ASSURES  
ACCURACY OF  
± .0001

Manufactured in  
all tapers, 1 to  
6 MT in stock.  
Special shanks  
and points  
made to order.

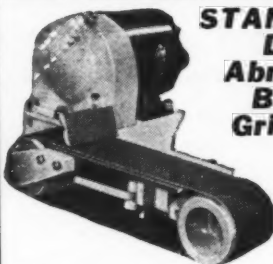
PAT.  
PEND. Points  
illustrated  
are  
standard.

Ask your Supplier or Write for Literature.

**ROYAL PRODUCTS**

87 UNION ST.

MINEOLA, N.Y.



## STANDARD D-4 Abrasive Band Grinder

Famous  
for  
Stamina

This new, streamlined bench type grinder assures fast, quality finishing on metals, plastics, wood, fibre . . . at low cost. Built to machine tool specifications, Standard D-4 is equipped with improved band tension control and specially designed protective motor hood 4x36 1/4" band. The ideal portable unit.

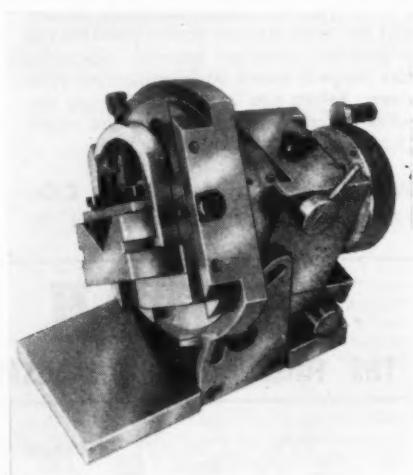
OTHER STYLES AND SIZES IN NEW  
MANUAL ON FINISHING—WRITE TODAY

**WALLS SALES CORP.**

333 Nassau Avenue, Brooklyn 22, N.Y.

## Precision Grinding Attachment

A new precision grinding fixture has just been introduced by the Star Gauge Co., 261 Oak Grove Ave., Springfield, Mass. This new device, designed as the Sine-A-Dex, is said to combine several advanced features which are to be found in no other single grinding attachment—features such as one set-up grinding of eccentrics and unlimited off-center work.



A face plate incorporating a vee block which can be set off-center in both directions permits the grinding of such items as rectangular punches requiring a radius on each corner. Two setting rings with finely cut verniers provide the fixture with a rapid and accurate means of setting included angles to any number of degrees on either side of any reference line.

The Starco Sine-A-Dex is stated by its manufacturer to be unexcelled for lowering tool room time costs. Hardened and ground throughout, the device can reduce considerably the time required in grinding rounds, flats, indexed sections, splines, radii, groove slots, etc. Light in weight small in size, the unit is said to be easily handled. The Sine-A-Dex can also be converted to the use of draw collets.

## Straight Shank T-Slot Cutters

A recent addition to the line of metal cutting tools made by Reltool Corporation, 4540 W. Burnham St., Milwaukee 46, Wis., are T-Slot Cutters with straight shanks,

## *There's a Walker Magnetic Chuck for Every Known Application . . .*

Standard Electro and Permanent Magnetic Chucks

Special Applications for Various Holding Problems

Vacuum Chucks . . . Demagnetizers

Magnetic Clutches

# **O. S. WALKER CO. Inc.**

**WORCESTER 6, MASSACHUSETTS**

*Original Designers and Builders of Magnetic Chucks*

for use in Reltool and other standard tool holders.

These tools feature greater side chip clearance which results in freer cutting action and less breakage. Staggered teeth are undercut and conform to the standard dimensions recently adopted by the Simplified Practice Committee. Reltool T-Slot Cutters, both straight and taper shank, are available from stock in a range of nine standard sizes, of from  $\frac{1}{4}$ " to  $1\frac{1}{2}$ " bolt size, incorporating cutters ranging from  $\frac{9}{16}$ " to  $2\text{-}21/32$ " in diameter. The shank sizes range from  $\frac{1}{2}$ " on the small size up to  $1\frac{1}{4}$ " (2-screw drive shank) on the largest.

### **Chicago Wheel Introduces New Vitrified Bond**

A 5% to 10% boost in grinding and finishing output is promised grinding wheel and mounted wheel users, thanks to a new vitrified bond developed by Chicago Wheel & Mfg. Co., 1101 W. Monroe St., Chicago 7, Ill.

Called "79E," this new bond is recommended by the manufacturer for portable grinding of billets, brake drums, forgings and forging dies, annealed malleable

castings, steel castings, centers and stainless steel welds, etc.

The new bond is said to assure a smoother, faster cutting action for vitrified grinding wheels operated at speeds up to 6,000 surface feet per minute.



Longer production time per wheel is also provided, with lowered down-time for change-over or wheel dressing afforded. And, being considerably tougher, these wheels resist wheel breakdown longer, the manufacturer states.

For ANY Size Machine

# Chandler-Duplex

COMBINED Boring  
and Facing Toolhead

**NEW! Re-designed! Added Features!**

**Accuracy -- Stamina**

**WRITE TODAY For Complete Details . . . . .**

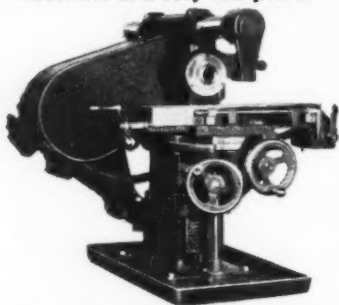
**CHANDLER TOOL CO**  
MUNCIE, INDIANA, U. S. A.

**A Boring Head That Won't Face Is NOT Complete**

**A Few Openings For GOOD Distributors**

## BURKE No. 4 Universal

*A versatile, precision small Milling Machine at a very low price.*



Power or hand feed. Use on bench or pedestal.

Send for complete information on various model Burke millers and attachments.

**The Burke Machine Tool Co.**

A Division of U. S. Burke Machine Tool Co.  
20 East 72nd St. Cincinnati 16, Ohio

## YOST DRILL PRESS VISE



This new Yost vise has been designed expressly for use on drill press operations. Does away with special and costly jig fixtures.

Offered in two sizes.

Vise No.	Width of Jaw, Inches	Opens, Inches	Weight Pounds
1D	3 1/2	3 1/2	12 1/2
2D	5	5 1/2	23

Do you need a vise of ANY type?

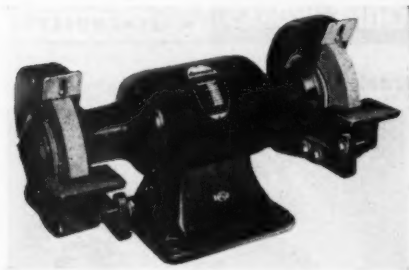
Write today for bulletins on the extensive Yost line

**YOST MFG. COMPANY**

1335 SO. MAIN STREET  
MEADVILLE, PENNSYLVANIA

## Four New Bench Grinders Announced by Cummins

Four new Bench Grinders have been introduced by Cummins Portable Tools, Division of Cummins Business Machines Corp., 4740 Ravenswood Ave., Chicago 40, Ill. They are described as sturdy, powerful units, designed for use in repair shops, metalworking plants and industrial tool and maintenance shops. The four grinders are respectively:



Model 470, 6-inch grinder, close coupled, with a  $\frac{1}{4}$  h. p. motor; the wheel size is 6" in diameter by  $\frac{1}{2}$ " wide, with a  $\frac{1}{2}$ " arbor hole; length is 11 $\frac{1}{2}$ ", height, 7 $\frac{1}{8}$ ", base is 6 $\frac{1}{8}$ " deep by 6" wide; the weight is 32 lbs.

Model 471, 6-inch grinder, long end bell; it has a  $\frac{1}{4}$  h. p. motor; the wheel size is 6" in diameter by  $\frac{3}{4}$ " wide, with a  $\frac{1}{2}$ " arbor hole. The length is 16"; height, 10"; the base is 8" deep by 7" wide; the weight is 38 lbs.

Model 475, 6-inch grinder, long end bell; it has a  $\frac{1}{3}$  h. p. motor; the wheel size is 6" in diameter by  $\frac{3}{4}$ " wide, with a  $\frac{1}{2}$ " arbor hole. The length is 16"; height, 10"; the base is 8" deep by 7" wide; the weight is 40 lbs.

Model 478, 8-inch grinder, long end bell; it has a  $\frac{3}{4}$  h. p. motor; the wheel size is 6" in diameter by  $\frac{3}{4}$ " wide, with a  $\frac{5}{8}$ " arbor hole. The length is 19"; height, 12"; the base is 8 $\frac{1}{2}$ " deep by 8" wide; weight is 85 lbs.

On all models, motors are ball-bearing equipped, with bearings sealed against dirt. An on-and-off toggle switch is mounted in the base. Removable guards give added convenience when using wire brushes and buffing wheels. Wheel speed is 3440 r.p.m. An 8-foot cord is rubber-covered, 2-conductor type, with a two-prong rubber plug (3-conductor for the 8-inch grinder). Adjustable eyeshields are available as extra equipment.

# KIPP

## *Air Grinders*



- **FASTER SPEEDS**
- **BETTER RESULTS**
- **LOW PRICES**

**MODEL JA**  
**50,000 R.P.M.**  
Weight 12 ounces; length  
6 $\frac{1}{4}$  inches; chuck size  
 $\frac{1}{8}$  inch. Wheel guard re-  
moved for better illustration.

**\$42**  
IN U.S.A.

## THEY GRIND—NOT JUST RUB!

The RPM's stay up while grinding... not only when the grinder runs idle. It is an established fact that surface speeds must stay up to approximately a mile a minute if you want to grind... not just rub. Every mechanic knows this, but an inexperienced buyer may order tools that maintain proper grinding speeds only when running idle. The speed of Kipp air grinders drops but slightly when put to work. That means better work... longer wheel life.

## MADISON-KIPP CORP.

207 Waubesa St., Madison, Wis., U.S.A.

Write for KIPP Air Tool Catalog AT 3006



# WALTHAM

## PINION AND GEAR CUTTING

### *Machines*

These machines are finished according to the work to be done. Send samples or dimensioned drawings and tell us about the cutting qualities of the material and probable production per week or month. Then wait for our reply with bulletin.

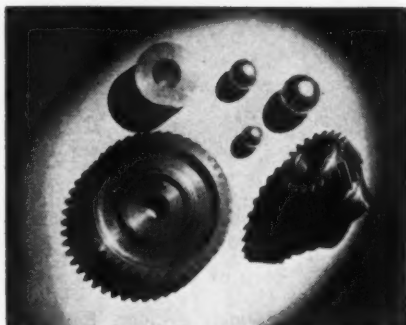
#### WALTHAM MACHINE WORKS

WALTHAM 54  
MASSACHUSETTS

### Tungsten Carbide Balls for Sizing of Internal Diameters

For accurate size control of internal diameters and low production costs, the use of tungsten carbide balls is becoming increasingly popular, according to Industrial Tectonics, Inc., Ann Arbor, Michigan. This firm has recently introduced a line of tungsten carbide balls featuring extreme hardness, high surface finish and compressive strength, resulting in excellent surface finish and good size control and size uniformity of the finished part.

Ball burnishing permits inexpensive, automatic production layouts, employing dial or hopper feeds for the parts and a re-circulating set up for the tungsten carbide balls. Even for large volume production, replacement costs for carbide balls are negligible because of their long tool life.



Case hardened steel parts have been sized successfully with carbide balls,

## THE "MIGHTY MIDGET" LINE

ORDER DIRECT on 10 day Money Back Guarantee

### MIGHTY MIDGET RADIUS DRESSER

7" Size

\$41.00 with Diamond



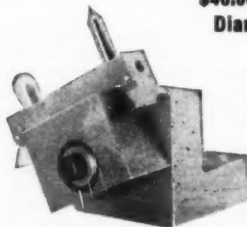
Hardened Shaft, Bearing Adjustable for Wear. Accurate, Adjustable 180° Stops. Diamond always Clamped Perfectly in Center.

10" Wheel Size for Norton DeAll  
\$46.00 with Diamond

Special 14" Size \$89.00 less Diamond

### MIGHTY MIDGET ANGLE DRESSER

\$46.00 with  
Diamond



First low cost high precision Angle Dresser on the market. Can be set very accurately with a protractor. Works underneath the wheel. Large bearing surfaces.

Ball Thrust Bearing. Heat Treated Cast Iron. Guaranteed Accurate.

**SPERMAN METAL SPECIALTIES • 2199 E. 21st ST., BROOKLYN 29, N. Y.**



## LET ENCO'S VERSATILITY CUT YOUR COSTS

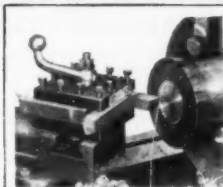


Photo No. 1  
1/2" square tool bit mounted in Model 4-1-S turret used for facing cut.

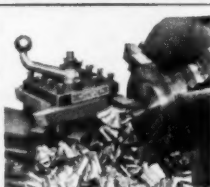


Photo No. 2  
The same tool used for broadface turning merely by indexing turret one position or 15°.

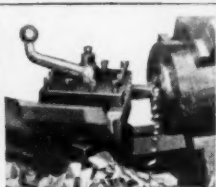


Photo No. 3  
Same tool used for inside chamfer merely by indexing back two positions or 45°.

The above photos illustrate the flexibility of 12 position indexing whereby each tool may be used in three different working positions.

### SPECIFICATIONS OF A FEW OF MANY ENCO TURRETS

Model No.	HD-2	6-S	4 1/2-R	4 1/2-S	3 1/2-R	3 1/2-S
Suggested Lathe Size	16" to 24"	14" to 20"	15" to 19"	13" to 16"	12" to 15"	10" to 13"
Tool Block Size	6 1/2" sq.	6" sq.	4 1/2" sq.	4 1/2" sq.	3 1/2" sq.	3 1/2" sq.
Solid Tool Capacity	1 1/2"	1 1/4"	1"	3/4"	7/8"	1/2"
Price	\$152.50	115.00	73.50	59.00	49.50	39.50

WRITE FOR CATALOGUE NO. 50 WHICH SHOWS TYPICAL APPLICATION PHOTOS OF MANY OF ENCO'S 35 MODELS ON ACTUAL JOBS.

Also Mfrs. of Mitl-Mite Magnetic Base Units and Enco Hex turret Bed Turrets and Tailstock Turrets for 9" to 18" Lathes.

**ENCO MANUFACTURING CO., Dept. 211, 4524 Fullerton Ave., Chicago 39, Ill.**

eliminating expensive grinding or honing operations.

Size of internal diameters can be readily controlled within plus or minus .0003". Higher accuracies are possible depending upon uniformity of hardness, surface finish and size of the unfinished i.d. Tungsten carbide balls can be furnished in sizes from 1/32" to 3" diameter with size tolerances of plus/minus .000025", sphericity tolerances of .000010" and surface finishes of 1 micro inch.

### Shakeproof Announces Keps Fastener

Shakeproof Inc., Division of Illinois Tool Works, 2501 N. Keeler Ave., Chicago 39, Ill. announces a new fastening invention, Keps, designed to make assembly operations easier and assure tighter, stronger connections wherever threaded nuts are employed.

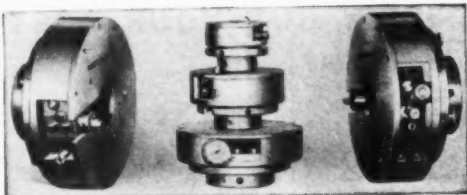
Keps, pre-assembled nuts and Shakeproof Lock Washers, extend all the advantages of the principle of pre-assembly to nut applications. The two parts are handled as one to eliminate costly hand operations. It is estimated that millions of hours of production time will be saved every year through their use. Other ad-

vantages include easier starting and driving, simplified ordering and stocking, and tighter fastenings, due to the efficient locking action of a Shakeproof Lock Washer under every nut.

Other outstanding Shakeproof inventions are toothed lock washers, Sems, pre-assembled screws and lock washers, and Thread-Cutting Screws. To these must be added the specially engineered fastening devices that Shakeproof has developed to meet specific needs in every industry.



The Keps Fastener at the left is for applications requiring American Standard Light Nuts; the one at the right is for applications requiring American Standard Machine Screw Nuts and American Standard Regular Nuts.



## MUMMERT-DIXON FACING HEADS

with Automatic Feed

One-way Tool Feed — 6, 9 and 10" sizes.

Two-way Tool Feed — 9, 12, 16, 20, 24, 30, 36, 40 and 46" sizes.

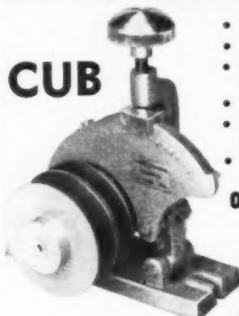
Save many costly set-ups.

Bulletin No. 4141 Gives Full Details

MUMMERT-DIXON CO., 122 Philadelphia St., Hanover, Pa.

## A VERY POPULAR DRIVE

### CUB



- 3.3-1 Range
- For "A" belts
- Positive alignment
- Ball bearing
- Machined cast iron
- Ship wt. 10 lbs.

Only \$18

TODAY  
ORDER  
(DIE CAST  
MODEL \$8.75)

### STANDARD NO. 2 4 x 4 DRY CUT BENCH MODEL

- Lifts on return stroke
- Ball bearing guide
- Automatic cut off switch
- Angle cutting by turning saw. (Saw turns instead of work)

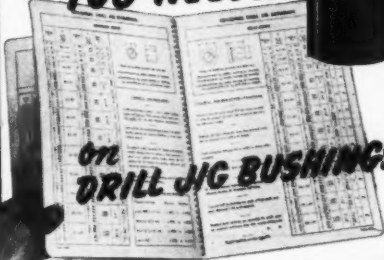
Price \$112.00 less motor  
FOB factory.

Ship. Wt. 84 lbs.

Standard Transmission Equip't. Co.  
70 W. UNION ST. PASADENA 1, CALIF.



## ALL THE DATA YOU NEED...



on  
**DRILL JIG BUSHINGS**

...at the flip of a single page  
Make drill jig designing easier  
with this "Flip-a-page" catalog.  
Free on Request

**COLONIAL BUSHINGS INC.**  
P.O. BOX 37, HARPER STATION  
DETROIT 13, MICHIGAN

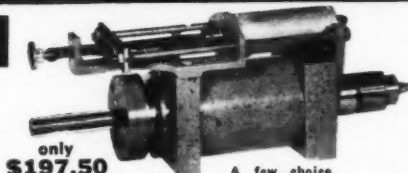
FOR PEAK PRODUCTION ON A WIDE RANGE OF WORK

## HYPNEUMAT

POWERFUL—AUTOMATIC  
DRILLING and TAPPING UNIT

Immediate  
Delivery

- 3 1/2" Stroke
- Drilling Capacity 3/8" in steel
- Tapping Capacity 3/8" in steel



only  
**\$197.50**  
for Basic Unit

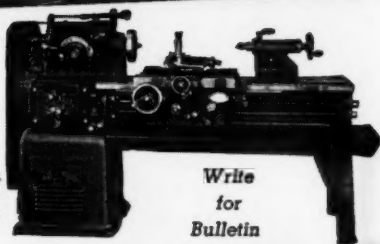
A few choice  
territories open  
for representatives

HYPNEUMAT INC., 647 W. Virginia St., Milwaukee 4, Wisconsin

## CARROLL and JAMIESON

- 16" Lathe
- 12 Speed Geared Head
- Motor Drive Timken Mounted Spindle
- Modern Design
- Liberal Dimensions

**Carroll & Jamieson Machine Tool Co.**  
BATAVIA, OHIO, U.S.A.



*Write  
for  
Bulletin*

### For 50 Years MOLINE "HOLE-HOG" MACHINE TOOLS

HAVE SERVED  
AMERICAN INDUSTRY  
1901-1951



DRILLING - BORING -  
HONING - TAPPING  
and SPECIAL MACHINES

**MOLINE TOOL COMPANY**  
102 20th St. MOLINE, ILLINOIS

## BARGAIN

**NEW HIGH SPEED HACKSAW BLADES  
PRICES ON HAND BLADES**

12" length x 1/2" wide x 18-24-32  
teeth. \$3.00 doz. - \$35.00 gross

10" Length x 1/2" wide x 18-24-32  
teeth. \$2.25 doz. - \$25.00 gross

Manufactured in England from the  
Finest Sheffield High Speed Steel

**Sold with a Money Back Guarantee**

**SID TOOL CO., INC.**

126 Lafayette St. New York 13, N.Y.

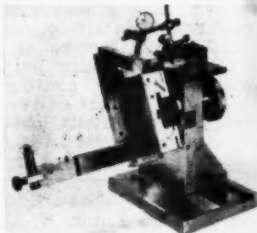
CUTTING TOOL SPECIALISTS

## GREATEST GRINDING ADVANCEMENT IN YEARS

The new Universal Form Dresser features a movable center line using gauge blocks on both column and base. Many radii and angles may be connected on the same wheel to complete an entire form. Angles are set by sine bar and increased range plus greater accuracy are possible because bearings and slides are of preloaded ball design.

*Write for Complete Details Today!*

**UNIVERSAL FORM TOOL COMPANY**  
7410 RUTHERFORD AVE. - DETROIT 28, MICHIGAN



## **Elliptical Gears Cut on Standard Hobbing Machine**

Barber-Colman Co., 8843 Loomis St., Rockford, Ill., is announcing a means of efficiently producing elliptical gears—said to be a new development in the gear-cutting field. These gears are cut



with a special form hob on a standard machine with a standard set-up. Although the value of elliptical gears has been realized for many years, there has been no means to produce them efficiently or accurately until the special form hob was developed, Barber-Colman states.

The hob has a number of leads equal to one-half the number of teeth in the gear, each lead cutting two diametrically opposite teeth. Since the teeth are designed from a base ellipse rather than a base circle, even the involute curves on opposite sides of the same tooth are not similar. Thus, each thread on the hob differs from each other thread. The hob is topping so that the gears can be cut from bar stock, eliminating the necessity of locating the hob with respect to the work. These true involute teeth designed from a base ellipse produce the best possible rolling action.

The unique feature of elliptical gears is that a constantly varying output is obtained from a constant input. Both speed and power will vary depending upon the eccentricity of the gears. Gears can also be designed which will produce a desired quick-return ratio.

**The Blair Tool and Machine Corporation**, College Point, N. Y. recently acquired the entire cam cutting facilities

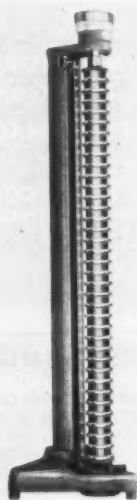
of The Daly Machine and Tool Co., Newark, N. J. The Daly machines will supplement existing Rowbottom equipment at Blair Tool and Machine, to offer a versatile cam cutting service for both large and small cams.

## **Cadillac 36-Inch Inspection Gage**

An addition to the line of Pla-Chek Gages manufactured by Cadillac Gage Co., 20316 Hoover Road, Detroit 5, Mich., is announced. The new gage, a 36-inch model, rounds out the line of Pla-Chek Gages which include the 6", the 12" and the 24" models.

The new gage is stated to be introduced as a result of demand from users of the other models. The increased speed of surface plate work and the greater accuracy of this type of inspection was desired for larger items than the 24" model could handle.

As with the smaller models, the 36" Pla-Chek is made from a hardened steel bar that contains 36 steps spaced exactly 1 inch apart. A micrometer screw thread is ground on the lower end and a large micrometer thimble above is graduated in .0001". When checking work on the surface plate, the micrometer thimble is



set at zero. The micrometer is then set for the desired dimension in thousandths and tens of thousandths. Then the measurement is taken from the desired inch step. Measurements are guaranteed accurate to .0002" within the 36" range.

bend pipe by hand or  
power with

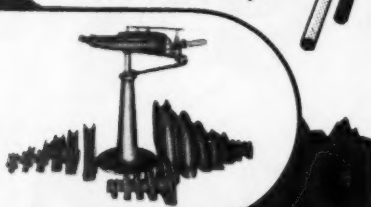
**American**

Cold Pipe, Conduit and  
Heavy Wall Tube

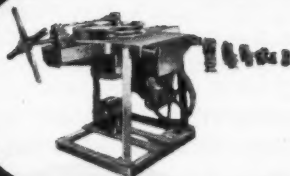
**BENDING MACHINES**

Fast...Simple...Dependable

**RADIANT HEAT BENDS**  
in Standard Pipe



Hand-Powered "American" A-30  
Fast . . . Accurate . . . Average  
bend takes only 10 seconds! Up  
to 180° bends . . . all sizes from  
1/2" to 2". Usual radiant heat  
bends for 1 1/4" at 6" and 9" radii  
can be supplied. Only 7 parts.  
Standard radius 5 times pipe size.  
Occupies 18" x 18" floor space.



Motor-Powered "American" 2PB  
Capacity 1/2" to 2" standard pipe  
. . . Standard radius 5 times pipe  
diameter up to 180° . . . Maximum  
radius 13". Complete with rolls  
for each size pipe. Standard motor  
equipment 2 h.p.

Special radii  
supplied on  
request

**American**  
PIPE BENDING MACHINE  
*Company*

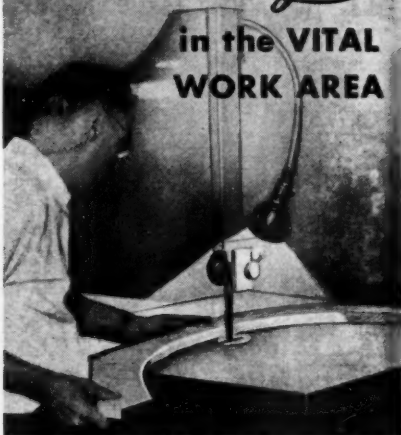
Factory and Main Offices:  
9 Furnace St., Poultney, Vt.

for **PRECISION PERFORMANCE**  
and **HIGHER PRODUCTION**

use

**VIMCO** *Lights*

in the **VITAL**  
**WORK AREA**



VimcoLight unit as installed on a  
Tannewitz High Speed Band Saw.

VIMCOLIGHTS . . . machine lights  
that supplement general plant light-  
ing on the vital work area . . . can  
help make your machine designs  
more **complete** . . . more **accepta-  
ble**. Your customers will appreciate  
VIMCOLIGHT installations because  
they make possible higher produc-  
tivity, greater ac-  
curacy and less  
worker fatigue.  
VIMCOLIGHTS  
are easy to install  
and highly versatile. When con-  
fronted with a special problem,  
consult our experienced engi-  
neering service.

WRITE FOR BULLETIN No. 74

**VIMCO MFG. CO., Inc.**

Since 1919

109 BRAYTON STREET BUFFALO, N.Y.

# Mechanics Through The Ages

**I**N HIS SIEGE AGAINST BERWICK, SCOTLAND, ENGLAND'S KING EDWARD III ISSUED A CALL TO THE FOREST OF DEAN FOR SMITHS TO ACT AS MILITARY ENGINEERS.



**AMONG** THE MODERN SURNAMES DERIVED FROM THE MEDIEVAL SMITH ARE SMITH, SMYTHE, DE SMYTHE (ENGLISH); SCHMIDT (GERMAN); FABRII, FABRICII, FABBRONI (ITALIAN); LE FEBRES OR LEFEVRES (FRENCH) AND GOW, GOWAN AND COWAN (SCOTCH). OTHERS ARE BROWNSMITH (MAKERS OF BROWNBILLS), NASMYTHS (NAILMAKERS) AND ARROWSMITHS.

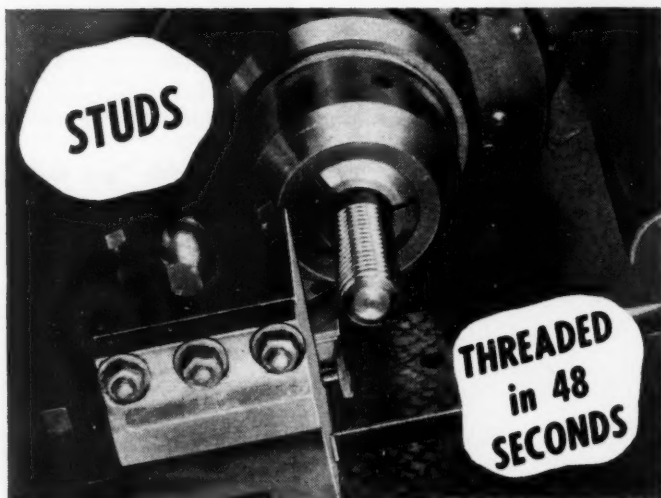
*Having* SEEN  
HOW SUCCESSFULLY FRENCH  
WAR PRISONERS IN SCOTLAND USED  
MICE TO TURN A TOY TREADMILL —  
DONALD HUTTON, A CANNY CITIZEN OF  
DUNFERMLINE, SCOTLAND, ABOUT 1812,  
HOOKED UP A COFFEE GRINDER TO A  
TINY TREADMILL, CAPTURED SOME MICE,  
AND SET THEM TO WORK GRINDING OATMEAL.





# **TOUGH STUFF** *threaded* **FAST**

**AT LOW TOOL COST!**



If you have a tough threading job to do, and it's under 4" diameter, the Cri-Dan Single Point Threading Machine points the way to high speed production at extremely low tool cost.

#### **THE CRI-DAN DOES:—**

- 1 — Milling
- 2 — Diehead Work
- 3 — Tap Work
- 4 — Grinding
- 5 — Roll Thread Work

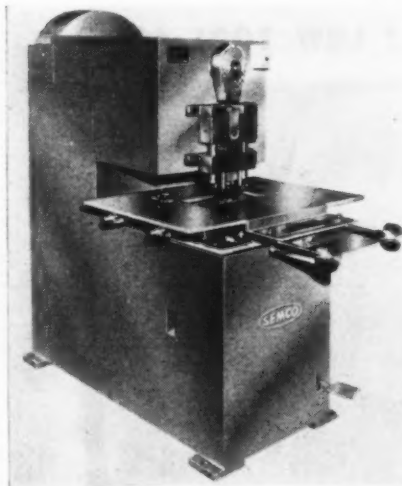
**Why not contact your Lees-Bradner Representative.**

*The* **LEES-BRADNER** *Company*

CLEVELAND 11, OHIO, U. S. A.

## Improved Nibbler Press

As many as 260 strokes per minute accelerate the hole, slot or notch punching speed of the new Semco Nibbler Press by as much as 15%, according to Service Machine Co., 340 Miller St. Elizabeth 4, N. J.



Sheets, strips, or plates up to  $\frac{1}{8}$ " thick can be punched with any shape of hole, slot or notch up to  $12 \times 4\frac{1}{2}$ " size at a single setting in a few minutes. Specifically, a 54 sq. in. area hole or slot can be punched to a pre-determined shape without special dies within  $1\frac{1}{2}$  minutes.

One  $\frac{1}{2}$ " round punch and die and one  $\frac{1}{2}$ " square punch and die are furnished as standard. Oval dies or special shapes for unusual contours or small holes are available on special order. Interchanging of dies can be accomplished in two minutes, according to the manufacturer.

Duplications of punched holes, slots or notches are positive because the punching is controlled by a template and as many identical duplicates as desired may be produced; the templates are saved for future use. Templates may be of any sheet metal, stiff enough to confine the follower pin;  $\frac{1}{8}$ " steel plate is recommended if considerable use is intended, but with care a template as light as 20 ga. steel can be used.

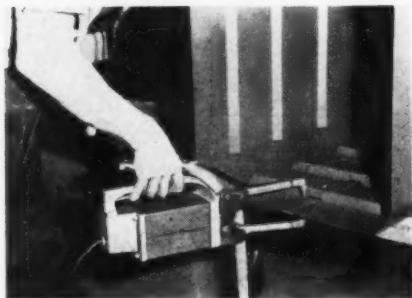
The ratio of template to actual work is 1 to 1 and the largest template blank of size  $17 \times 6$ " is dropped over two studs. With the exact size and shape of the hole

or slot cut in the template, a follower pin confines the movement of the work table within the prepared template area as the operator guides the punching with two hand knobs—one for backward and forward, and one for left to right movement of the work table.

The Semco Nibbler Press weight 2100 pounds, occupies a  $28 \times 55$ " floor space exclusive of its operating unit extensions and is  $69\frac{1}{2}$ " high. The throat depth is 20" with a  $4\frac{3}{4}$ " clearance. Stroke is  $1\frac{1}{2}$ ". Maximum shut height is  $3\frac{3}{4}$ " and minimum is  $2\frac{3}{4}$ ". The power is provided by a 1 h.p. precision motor, which drives through a high reduction 73 lb. flywheel. The press is of reinforced heavy steel plate welded construction throughout with easy access to all working parts.

## "Zip" Portable Spot Welder

A new portable spot welder known as the "Zip" is introduced by Mid-States Welder Mfg. Co., 6025 S. Ashland Ave., Chicago, Ill., manufacturers of A.C. Arc Welders.



Exclusive features such as a fixed top tong, newly designed adjustable curved tips, and overall construction of the new unit, permit greater ease of handling and operation, while making possible scores of new spot welding applications, the manufacturers state.

It is a well-balanced unit, with the center of gravity at the carrying point, therefore it requires only one hand to operate. Assorted tong lengths and shapes are available for specific spot welding applications.

The unit is completely portable, weighing 23 lbs. It welds mild steel, stainless, galvanized iron, terne plate and magnesium up to  $\frac{1}{8}$ " combined thickness of metal. Models are available for either 110 volt or 220 volt a.c. current lines.

**OUR  
EFFICIENT  
TOOL DESIGNING**

*means  
better production  
at a lower cost*

Efficient tool designing in post-war's competitive production is a "must". Our experience guarantees you tools—designed for economy of operation, resulting in your increased production at lower costs.

**COLUMBUS DIE TOOL  
and Machine Co.**

930 CLEVELAND AVE., COLUMBUS 1 OHIO

**STERLING DRILL GRINDER**



**CAPACITY:**  
3/8" to 2 1/2" drills.  
5" x 9" adjustable table.

**MOTOR:** 1/2 hp,  
3450 rpm.

**NET WT:** 250 lbs.

**CRATED:** 320 lbs.

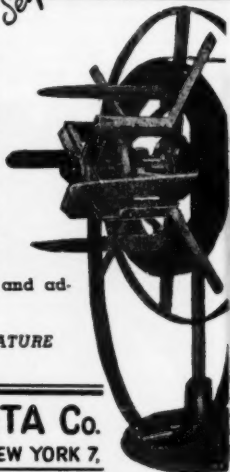
**McDONOUGH MANUFACTURING CO.**  
EAU CLAIRE, WISCONSIN, U. S. A.

**WESTLEN REELS**

*Adjustable  
Self Centering*

For feeding strip and wire coil stock to presses. Coil capacity 300 to 500 lbs. Outside ring dia., 28" to 36". Height of reel, 36". Wheel automatically adjusts parts to suit inside diameter of coils from 11" to 20". Arm allows for quick conversion to horizontal or vertical position and adjusts height of reel.

SEND FOR LITERATURE



**The RULETA Co.**  
27 WARREN ST. NEW YORK 7.

**Micro  
Supreme  
LAY-OUT AND  
IDENTIFICATION DYE**

**13 COLORS**

For Tool, Die, Pattern or Template layout on metal . . . Quick identification of bar stock, sheet, strips or parts . . . Shows up in sharp relief—dries instantly . . . Write for sample and circular on company letterhead.

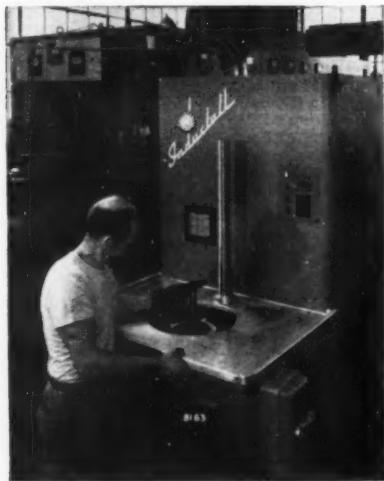
**MICHIGAN CHROME &  
CHEMICAL COMPANY**

6340 E. Jefferson Ave. • Detroit 7, Mich.

## Radio-Frequency Gear Hardening Machine

A new radio-frequency gear hardening machine, for high-production heat treating of gears, is available from Westinghouse Electric Corporation, 306 Fourth Ave., Pittsburgh 30, Pa.

This machine—the Inductall—is used with a vacuum-tube radio-frequency generator, a 10,000-cycle motor-generator set, and other associated equipment, to



harden spur gears, cluster gears, integral spindle gears, and also shafts. The machine carries each gear through an automatic cycle for either through- or contour-hardening. Uniformity of hardening results from the mechanical gear handling system and precise electrical timing of the pre-heat, heat-treat, and quench operations.

The Inductall system is flexible, and is said to lend itself readily to expansion to meet increased production requirements. It is simple to operate and maintain, and does not require skilled labor for operation. Designed for in-line production methods, it can help reduce handling costs, work-in-process inventories, and associated storage problems.

### Double-Taper Adjustable-Diameter Sheave

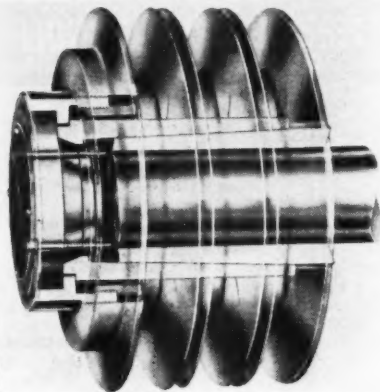
The American Pulley Co., 4200 Wissahickon Ave., Philadelphia 29, Pa., announces an adjustable-diameter V-belt sheave, with taper bushing and taper sleeve on which the flanges are mounted. This double-taper hub feature, in addi-

tion to providing easy mounting and dismounting of the sheave, is designed to lock the unit into a single, "solid" sheave, thereby eliminating vibration, wear and fretting corrosion—performance said to be never before obtainable in an adjustable-diameter sheave.

The split-taper bushing provides easy handling on-and-off the shaft, and adapts the sheave to any shaft size. It also assures positive clamping action on the shaft (whether oversize or undersize) and quick breakaway when dismounting. The split-taper sleeve provides positive locking of the flanges to the hub which eliminates all flange looseness. When the bushing is pulled in tight to lock it on the shaft, the wedging action expands the taper sleeve against the flanges, making the entire unit a single "solid" sheave.

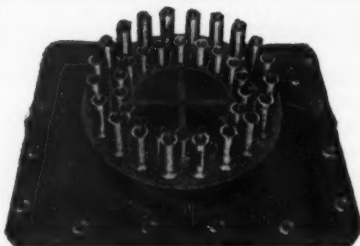
Since there are no clearances when the sheave is locked and operating, there can be no peening or fretting of metal parts, thus, corrosion and freezing of the flanges to the hub are eliminated.

By eliminating all operating clearances between the hub and flanges of the sheave, vibration is eliminated and factory-dynamic balance constantly maintained. The simultaneous movement of



all flanges, when settings are changed, maintains V-belt alignment.

The manufacturer believes that the new double-taper adjustable-diameter sheave offers to industry the full advantage of adjustable speed drives without the difficulties heretofore encountered in adjustable-diameter drives. It will be especially useful wherever drive conditions are unusually severe.



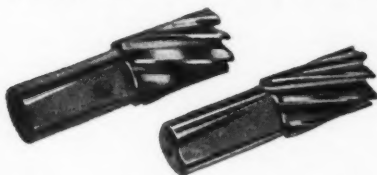
Pictured: a 38-Spindle Heavy-Duty  
Drill Head

**DESIGNERS AND  
MANUFACTURERS OF  
MULTIPLE DRILLING EQUIPMENT**

*We invite your inquiry.*

**MICHIGAN DRILL HEAD CO.**  
971 E. 8 Mile Road Hazel Park, Mich.

***YOU PROFIT* on every  
job you send to Rutland!**



Rutland reworked or repaired  
cutting tools are guaranteed to  
give new tool performance —  
at a fraction of the new tool cost.

Recutting • repairing • replacing Carbide tips.  
Special tools from obsolete or standard tools, etc.

Call or Write

***Rutland* TOOL SERVICE**

1617 E. McNICHOLS • DETROIT 3, MICH.

TW inbrook 3-6240



**CARES**

about the manhours lost when fasteners  
aren't accurately made. That's why

***Wm. H. Ottemiller Co.***  
of YORK, PENNA.

has acquired such a reputation for  
making the finest in:

CAP SET COUPLING MILLED  
SCREWS SCREWS BOLTS STUDS

Next time you order—be wise—

SPECIFY ***Ottemiller***

**ARTUS PLASTIC SHIM**

AND

**FEELER  
GAUGE  
STOCK**



The COLOR  
tells the  
THICKNESS

Each thickness a distinctive, easy to  
identify color. Impervious to oil. Long  
lasting. 5"x20" sheets. Special sizes to  
order. Handy assortment, shim stock, 12  
colors—12 thicknesses (.001-.030). Bound  
together, \$4.25

Order today. Immediate delivery.

**INDUSTRIAL PRODUCTS SUPPLIERS**

434 Broadway, Dept. H, New York 13, N. Y.

## FRONT LEVER BENCH PUNCH



**STURDY  
•  
DURABLE  
•  
HANDY**

Capacity:  $\frac{1}{8}$ " hole  
through  $\frac{1}{4}$ " steel or  
equal.

**Immediate shipment.**

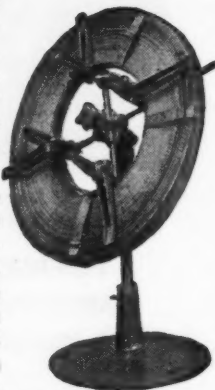
Punches and dies are  
carried in stock in a  
large range of round,  
square, flat, and oval  
sizes.

*Send for Circular.*

**T. H. LEWTHWAITE MACHINE CO.**  
312 East 47th Street New York 17, N. Y.

## QUICK-LOADING STOCK REELS

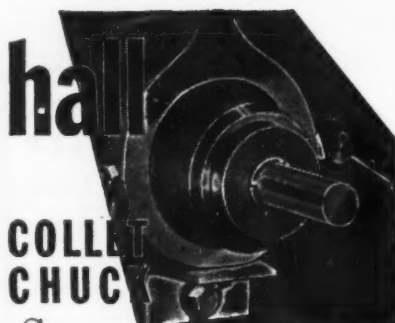
The S and S stock  
reels with quick load-  
ing arms are de-  
signed for the eco-  
nomical handling of  
stock from coils. Con-  
structed with a snap  
lock knuckle joint  
for loading. These  
reels may be set in  
any plane from verti-  
cal to horizontal.  
Double swivel reels  
are manufactured so  
that loading is pos-  
sible while other spool  
is reeling out stock.



Dial And Roll Feeds For Presses



**MACHINE WORKS**  
4539 W. Lake St., Chicago, Ill.



**hall**  
**COLLET  
CHUCK**  
**SPEED UP** production in multiple  
operations with push-out type Hall  
Collet Chuck. Full spindle capacity  
or over. Tremendous grip over or  
under stock size to .007 — without  
adjustments . . . no bearings, fric-  
tion, heat or loss of power. Instant  
release without stopping lathe.

2-inch capacity, \$145; 3-inch capacity, \$295;  
1-inch capacity, \$95

Round, square or hex collets, plain-serrated  
**HALL MANUFACTURING COMPANY**  
622 Tularosa Dr., Dept. A, Los Angeles 26, Cal.

## Memo re: STEEL STAMPS & MARKING DEVICES

That Newco bevel on  
New Method's does a  
swell job of giving  
clear markings with  
less effort and long-  
er stamp life.

Better get a copy of  
their catalog and  
look it over for ways  
and means to cut our  
marking costs.

**Write to:**

**NEW METHOD STEEL STAMPS, Inc.**  
149 Joseph Campau, Detroit 17, U.S.A.



## Easy TO REDUCE SET-UP TIME!



You'll be surprised at how much time the Ziegler Holder will save you in making tapping and reaming set-ups because of its ability to compensate for alignment inaccuracies of as much as  $1/32''$  radius or  $1/16''$  diameter.

Once you try it out, you'll never again be satisfied with ordinary tool holders.

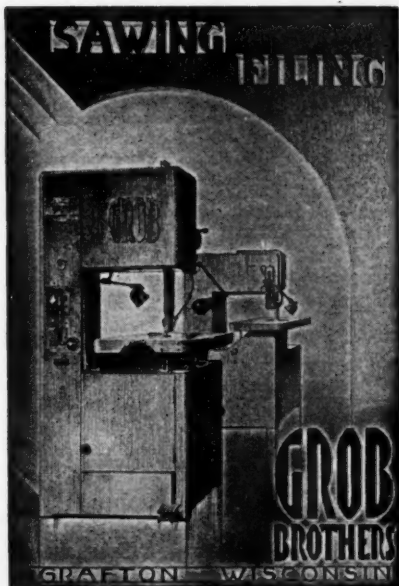
W. M. ZIEGLER TOOL CO.

13570 Auburn, Detroit 23, Mich.

*Ziegler*  
ROLLER  
DRIVE

WRITE FOR  
CATALOG

**FLOATING HOLDER**  
for Taps and Reamers...



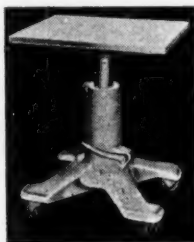
## NIELSEN Heavy Duty *Live Centers*

Write for  
catalog on  
live centers

Adapted  
for heavy  
duty work.  
Precision type  
ball and roller  
bearings assure  
maximum capac-  
ity for high speed  
production and long  
service.

**NIELSEN, INC.** LAWTON,  
MICH.

## PORTABLE ELEVATING TABLE



**Saves  
TIME  
and  
LABOR**

Eliminate heavy lifting and cut handling costs. Slight foot pressure varies height up to  $15\frac{1}{2}''$ , leaving operator's hands free. Table swivels and locks in any position.

SEND TODAY FOR ILLUSTRATED  
CATALOG NO. 2

**MIDWEST TOOL & ENG. CO.**  
112 WEBSTER ST., DAYTON, OHIO

### Bay All-Steel Shelf Truck

Bay Metal Products, 3003 N. 16th St., Philadelphia 32, Pa., has recently introduced a standard Shelf Truck that has wide application in factories, tool rooms, etc., for the speedy movement of stock or tools. The trucks are 36½" high. Shelves are made of 14-gauge steel with a 2" flange; the legs are of 1¼"x1¼"x½" angle iron. Each shelf is attached to the legs with 16 bolts, nuts and lock washers, giving exceptional rigidity to the assembly.



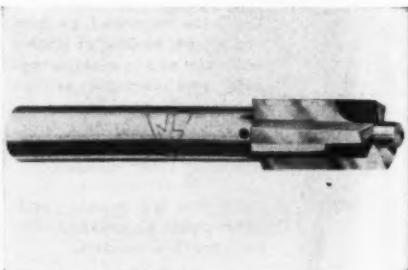
The bottom shelf is fixed with the flange turned up, others are reversible. Trucks are supplied with two 5" rigid casters, and two 5" swivel casters, either rubber or steel tired. The unit is finished in baked green enamel. Bulletin No. 36 gives complete information.

### Wendt-Sonis Carbide-Tipped Tools

In American production machining plants, a growing emphasis is being placed upon the value of carbide-tipped cutting tools. Among the carbide-tipped tools consistently in demand, according to George Herrick, sales manager of Wendt-Sonis Company, Hannibal, Mo., is the counterbore.

Among the reasons for the increasing popularity of carbide-tipped counterbores is their great design improvements. Wendt-Sonis—one of the most prominent manufacturers of carbide-tipped cutting tools—has perfected its counterbores to

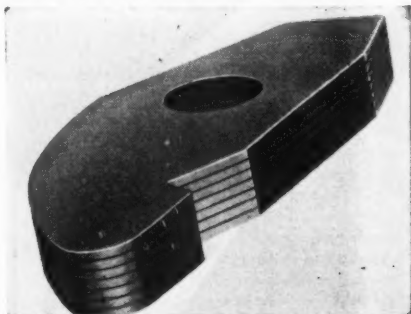
eliminate chatter and provide an extra-smooth finish. In addition, the tools are stated to turn out more pieces between grinds. A special Wendt-Sonis flute design gives maximum support behind carbide.



In addition to counterbores, Wendt-Sonis manufactures a complete line of carbide-tipped cutting tools, including boring tools, centers, spotfacers, cut-off tools, drills, end mills, fly cutters, tool bits, milling cutters, reamers roller turning tools and special bits.

### Copper Brazed Cams

How to reduce cam costs even on relatively small lots is of vital interest to many manufacturers. Frequently the answer is the use of stamped steel laminations, stacked together, and copper brazed into a single unit. Such cams are said to be approximately equal in strength to those made from solid steel, have a high degree of accuracy and can be heat-treated by conventional methods. Savings are substantial because production costs are inherently low.



Technical Metal Processing Inc. of E. 55th St. at Lake Court, Cleveland 14, Ohio, manufactures copper brazed laminated cams to fit a wide variety of needs.



CLOSED

TRADE



CLOSED

MARK



Plain Type

Offset Type

## CONTINUOUS HINGES

All hinges shown can be furnished with special holes, cutouts and bends to blue-print in metals to suit the job.

**AUTO Moulding  
& MFG. CO.**

1110 E. 87TH ST.  
CHICAGO 19, ILL.

**SPECIFICATIONS:**

Open width  $\frac{1}{8}$ " to 4"  
Gage Material .040 to .125  
Pin Diameter .101 to  $\frac{1}{8}$ "  
Lengths to 120"

THREE-FOURTHS OFFSET



SEMI-OFFSET



### TROYKE ROTARY TABLES WORM WHEEL OPERATED ROTARY TABLES . . .



9" - 12" - 15" -  
18" - 21" - 25"

### BALL BEARING STATION INDEXING TABLES . . .



12" - 15" - 18"

See your  
dealer or  
write for  
Catalog 14

**TROYKE MFG. CO.**  
CINCINNATI 9, OHIO, U.S.A.



### ★ THE ★ WONDER CUTTER

The lowest -  
priced wire and  
rod cutter on  
the market. The  
hardened cutter-  
last indefi-  
nitely.

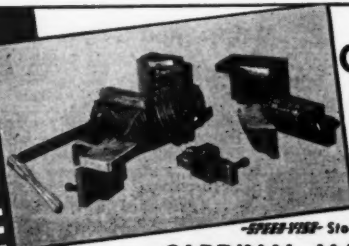


Hand operated. A giant for work, cuts  
wire and rods up to  $\frac{3}{8}$ -in. round or  
 $\frac{3}{8}$ -in. square and band iron up to  $\frac{1}{2}$ -in.  
by 2-in. Adjustable stop for repeated  
cuts to same length. Large or small,  
your shop can use a WONDER CUTTER.

Write today for prices.

**THE FEDERAL FOUNDRY SUPPLY CO.**  
4602 East 71st St., Cleveland 5, Ohio

A  
HUNDRED  
JIGS  
IN  
ONE



### CARDINAL -SPEED-VISE-

**\* EXCLUSIVE FEATURES**

1. Saves time — one hand operation — "lift, slide, lock!"
2. Saves tooling expense — smaller, simpler jigs.
3. Saves space in tool crib.
4. Indispensable for toolroom work in addition to production.

NEW LITERATURE AVAILABLE

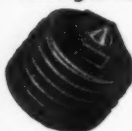
-SPEED-VISE- Stocked by leading Distributors

**CARDINAL MACHINE COMPANY**  
GLENDALE, CALIFORNIA



## A REAL HELPING HAND

It's a help that die makers, tool makers, machinery builders and general machinists have long sought—a more accurate and surprisingly faster way of transferring blind screw holes.



The Heimann Transfer Screw Set is a self-contained, complete tool. No wrenches or pliers are necessary. Made in  $\frac{1}{8}$ " to 1" diameters. Send for pricelist.

**HEIMANN MFG. CO.**

332 Lincoln Ave.

Urbana, Ohio

## PLYMETAL BRAZING SHIMS for CARBIDE TOOL TIPS



- In
- SILVALOY #2501 and
  - SILVALOY #5031



Silvaloy No. 2501 and No. 5031 are clad materials furnished in three thicknesses: .020 thick consists of .010 copper center—clad both sides with .005 Silvaloy No. 2501 .011 thick consists of .005 copper center—clad both sides with .003 Silvaloy No. 503 .016 thick consists of .008 copper center—clad both sides with .004 Silvaloy No. 503

Each of the alloys are furnished with or without radius, square or rectangular, Pentagon shape 80 degree with radius, Pentagon shape 60 degree no radius, triangle, circles, etc. Available in all standard tool sizes.

Shims are also available in Silvaloy No. 503, No. 2501, Constantine and Copper.

### STEEL SALES CORPORATION

3348 So. Pulaski Rd., Chicago 23, Illinois  
Blshop 7-7700

## RIVETING?

use

### LINLEY Noiseless Riveting Machines



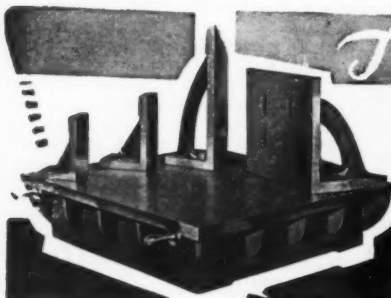
Sturdy, fast, easily operated! Put your production rivet spinning jobs on Linley Riveting Machines and watch your costs come down.

We are glad to demonstrate the quality of work that can be turned out. Send us samples of your parts and you'll be impressed with what you can do and how little it will cost you. Sizes and types available for iron or cold rolled steel rivets up to  $\frac{1}{2}$ " with capacity for larger rivets of softer materials.

Send for descriptive bulletin R.

### LINLEY BROTHERS CO.

673 State St. Ext. Bridgeport 1, Conn.



*Try*

## MILWAUKEE EQUIPMENT FOR TESTING AND CHECKING

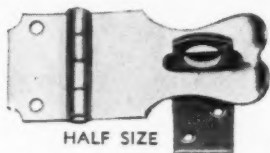
Over twenty years of experience gives you "proved" performance — added assurance of quality production. Milwaukee Surface Plates, Angles, Parallels and Straight Edges are all made of the highest quality semi-steel and finished to exact dimensions.

WRITE TODAY FOR YOUR FREE CATALOG

### J. C. BUSCH COMPANY

Engineers and Machinists Since 1907

165 S. BARCLAY ST. • MILWAUKEE 4, WIS.



HALF SIZE

HASP & STAPLE



WITH OR WITHOUT HOLES

Butts and Continuous Hinges for Cabinets, Cases, etc.

**S & S HINGE AND METAL PRODUCTS CO.**

4725-4735 IOWA ST.

DEPT. B

CHICAGO 51, ILLINOIS

### WOULD YOU BUY AN IMITATION DIAMOND?

We don't believe you would

SINCE 1935 the standard of performance on all diamond wheel lubrication



GOOD JOBBERS will not sell you an imitation of the results STADOIL will give you on your diamond wheels.

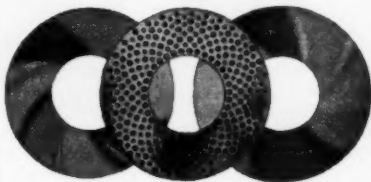
SAMPLES GLADLY

ask your Mill Supply or Industrial jobber, or we will supply you direct

**STADOIL MANUFACTURING CO.**  
EL MONTE, CALIF.

### FLAT OR GROOVED RACE BALL THRUST BEARINGS

WITH BRONZE RETAINERS

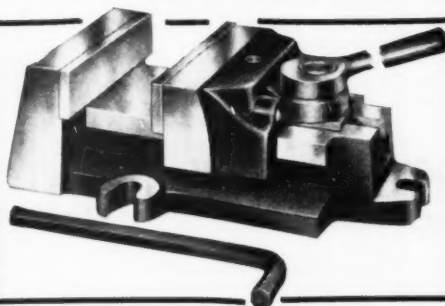


We can make them up to 25" outside diameter. We are geared to handle all of your thrust bearing needs.

Send us your blueprints

Makers of all types of dependable thrust bearings for over 30 years.

**ACORN BEARING CO.**  
68 STANLEY ST. NEW BRITAIN, CONN.



### PLUNKET QUICK ACTION VISE for DRILL PRESS or MILLING MACHINE

Designed for production work, using an eccentric motion to apply pressure to jaws. Eccentric motion moves jaws 5/16".

Size Net Price  
6" jaws, 1 1/2" deep, opens 4".....\$69.30  
Pressure between jaws, with handle furnished, 2200 lbs. Net weight 36 lbs.  
Our complete line includes Vises for Drill Presses, Milling Machines, Shapers, Grinders

WRITE FOR CATALOG

**J. E. Plunket Machine Co.** 1823 W. Lake St. Chicago 12, Ill.



***"Freedom of thought  
and independence  
of action..."***

**DONALD W. DOUGLAS**  
President, Douglas Aircraft Company, Inc.

***"Freedom of thought and independence of action are among the keynotes of America's economy. They are fundamental to our way of life. Systematic savings through the Payroll Savings Plan help the individual maintain his own independence and freedom of action and make us strong as a nation."***

The widespread success of the Payroll Savings Plan is an excellent example of our freedom of thought and independence of action. Far-sighted employers offered these 8,000,000 Americans an opportunity to enroll in the Payroll Savings Plan. There was no pressure, no emotional stimulation. A Payroll Savings Plan application was placed before them. They "signed up"—to the benefit of themselves, their companies and their country.

Has every man and woman in your company been offered an opportunity to share

in the benefits of the Payroll Savings Plan? Delegate one of your top executives to conduct a person-to-person canvass of your employees. Make sure that every man and woman gets an application blank. You don't have to urge them to enroll—they are anxious to build for their own independence.

Get in touch with your State Director, U. S. Treasury Department, Savings Bonds Division. He is ready to help you—with a package plan that reduces your work to the minimum.

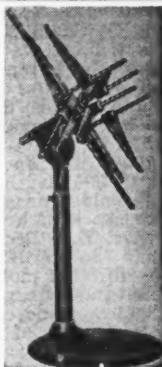
*The U. S. Government does not pay for this advertising. The Treasury Department thanks, for their patriotic donation, the G. M. Basford Company and*

## **MACHINE & TOOL BLUE BOOK**

**222 E. WILLOW AVE., WHEATON, ILL.**







## Universal Stock Reel

The Humm Universal Stock Reel is an essential device for the handling and feeding of coil stock to Power Presses.

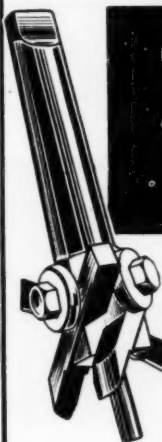
1. Adjustable Reel to fit various sizes of coil.
2. Reel is adjustable to suit height of Press.
3. Reel can be inclined to any position.

Stock Reel with plain bearing \$35.00

Stock Reel with roller bearing \$65.00

Manufactured By

**John Humm Safety Equipment Co.**  
253 SHEFFIELD AVE., BROOKLYN 7, N. Y.



## **Clark** ADJUSTABLE HOLE CUTTER

Finished cuts the first time in boiler plate, pipe, plastics, hard fibre, stainless steel, Transite, etc. 7 models cut variable expansions from  $\frac{3}{8}$ " to 5" holes, with thickness capacities from thin sheets to 1".

**ROBERT H. CLARK COMPANY**

Beverly Hills, California

Manufacturers of Precision Cutting Tools

## REID SURFACE GRINDERS

★  
THE PRECISION  
CHOICE OF WORLD-  
WIDE INDUSTRY

★  
1900 - 50th - 1950

Anniversary

**REID BROTHERS CO., INC.**  
Beverly • Massachusetts

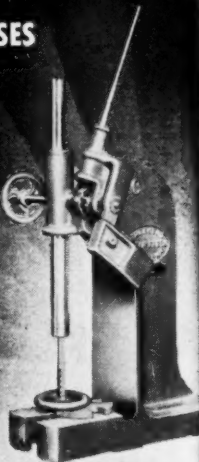
## *Greenerd* ARBOR PRESSES

For Assembling  
Keyway Cutting  
Broaching  
Piercing  
Oil Grooving  
Straightening  
Forming  
Pressing  
And many other jobs

65 Standard styles and sizes  
From  $\frac{1}{4}$  to 35 tons pressure for manually operated presses  
From  $1\frac{1}{2}$  to 30 tons pressure for motor driven hydraulic presses

Originators of the  
Arbor Press

Send for Catalog 40-H



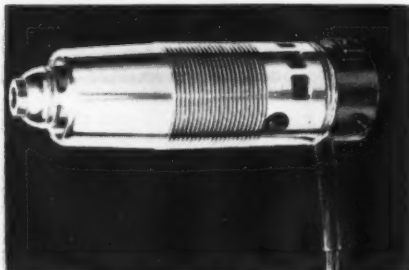
**GREENERD ARBOR PRESS CO.**

141 CROWN ST.

• NASHUA, N.H.

### Precise Grinder-Miller Performs Multiple Operations

A new Model Super 50 Grinder-Miller has been introduced by Precise Products Co., 1331 Clark St., Racine, Wis. According to the manufacturers, the appearance of this new unit constitutes a significant

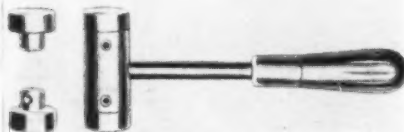


advance in production tooling. It is possible to employ either the new Precise Super 50, or its predecessor, the Super 40, in mounted set-ups on available machine tools in order to obtain the same speed, finish, and precision which has hitherto been possible only on heavy duty machine tools costing up to 100 times as much.

A wide variety of advantages of the versatility and simplicity of this Grinder-Miller become instantly apparent, once the unit has been seen in action. Precision grinding, milling, small diameter drilling, finishing and micro-finishing of small parts in production can be done with the new Precise Super 50 Grinder-Miller. An illustrated catalog contains complete information on the Super 50; it is available upon request.

### Gregory "Softip" Hammers Redesigned

A new series of "Softip" Hammers, provided with longer handles for better bal-



ance, a hand grip shaped to fit the palm comfortably, and grooved to prevent turning in the hand, with ferrules made

of brass tubing, is announced by Gregory Tool and Manufacturing Co., 25946 W. 7-Mile Road, Detroit 19, Mich.

These tools are furnished with renewable copper, brass and plastic tips and solid copper, brass or plastic heads; their sizes range from  $\frac{3}{4}$ " to  $1\frac{1}{2}$ " in diameter; the weights are from 3 oz. to  $2\frac{1}{2}$  lbs. Large sizes from  $1\frac{3}{4}$ " to  $2\frac{1}{2}$ " in diameter, with weights from  $4\frac{1}{4}$  to  $10\frac{1}{2}$  lbs. have leather washer grips, assembled on steel shafts which absorb the shock of heavy blows and do not splinter. The "Perfect Balance" line of Gregory "Softip" Hammers consists of twelve different models which include 56 different numbers, providing a hammer for light taps and controlled blows for a great variety of industrial uses.

### Automatic Hopper Feeding Unit

Feedall Machine and Engineering Co., 29 Elm St., Willoughby, Ohio, introduces the Model H-100 automatic, self-contained Hopper Feeding Unit. A selector ring



driven by a fractional horse-power motor rotates through the work which is selected and fed from the underside of the ring, thereby achieving the selection and feeding of the part in one operation. This unit is said to be especially adapted to the feeding of flat cylindrical work, such as washers, nuts, bearing races, special stampings, etc. Among the uses for this feeding unit are the applications to assembling presses, automatic welding machines, and many second operation machines.

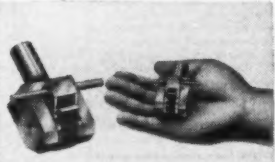
# inSta

## Coolant Cutting Compound Greatest Timesaver Ever Used

Practically eliminates tool breakage with re-jects cut to the bone.

"The Coolant with hidden Energy"

**JAS. W. WEST, Distributor**  
1016 Pawnee, Kansas City, Kan. Fi. 6627



**ALL  
SIZES**  
of  
Numbering  
Machines  
for  
Consecutive  
Numbering  
Write to—

**THE ACROMARK CO.**  
15 MORRELL ST. ELIZABETH 4, NEW JERSEY



**STAMPINGS**  
IN SMALL LOTS

Precision Die Made — Lowest Possible Cost.  
**DAYTON ROGERS MFG. CO.**  
Minneapolis 7, Minn.

**FREE bulletin!**  
"What you should know  
about LIVE CENTERS"



**FALLS PRODUCTS INC.** 122 Genoa St.  
GENOA, ILL.

**DANNEMAN**  
*Precision*  
**DIE-SETS**



Precision-Bored  
on Master Plates

**DANNEMAN DIE-SET DIVISION**  
ACME-DANNEMAN COMPANY, Inc.  
201 Lafayette St. New York 12, N.Y.

CATALOG  
ON REQUEST

# CAMS

A complete cam cutting service for both large and small cams is offered by our **ROWBOTTOM** and **DALY** cam milling facilities.

May we quote **YOU?**

**BLAIR TOOL AND MACHINE CORP.**  
119-02 15th Ave. College Point, L.I., N.Y.

**ATLANTIC**  
**GEARS**



SPUR-SPIRAL-WORM-BEVEL GEARS  
GENERATED WITH PRECISION ON  
MODERN EQUIPMENT—SEND SAMPLES  
OR BLUEPRINTS FOR QUOTATION!

**ATLANTIC GEAR WORKS, INC.**  
198 LAFAYETTE ST.-N.Y. 12, N.Y.

**CA 6-1440**



**REICH 3-WAY  
PRECISION TEST INDICATOR**

Lifetime conical bearings, stainless and non-magnetic. Sturdy construction. Needs no service or adjustment. .014" reading.  
Price \$6.75 Write for folder

**J. R. Reich Manufacturing Co.**  
45 E. Stroop Rd. Dayton 9, Ohio

## SAVE ON PALLEY WAR SURPLUS MACHINE TOOLS

### JUST RECEIVED!! - \$600,000 INVENTORY OF TAPS, DRILLS, CUTTING TOOLS, MILLING CUTTERS, METAL SAWS, ETC. - NEW!!



**1950 CATALOG**  
Just off the presses.  
Loaded with Machine Tools, Pumps, Hydraulics, etc. Send for it Today!!

We've made a terrific buy and we're passing the savings on to YOU!! ALL these tools are NEW - in Perfect Condition - NO SECONDS - NO REJECTS, at PRICES THAT MEAN SAVINGS UP TO 85%. Many are well known makes such as Union, Morse, National, Goddard & Goddard, Cleveland, Pratt & Whitney, Whitman & Barnes, Scully-Jones, Armstrong, Thurston, Brown & Sharpe, and others. Order now while we've got 'em at these BIG DISCOUNTS - They won't last long.



### SPECIAL BARGAIN #29 HYDRAULIC CYLINDER

Gives 20,000 lbs. thrust (push/pull) using 1500 PSI line pressure as obtained from our hyd. pumps. Or will produce 40,000 lbs. thrust with 3,000 lbs. line pressure. CAN ALSO BE OPERATED ON LOW PRESSURE AIR SYSTEMS. 4" Bore, 1 1/2" dia. piston shaft, 18" stroke, length 30 1/2". Equipped with ball bearing loaded clevis type mounting and swivel type high pressure steel pipe bracket for easy use. Ideal for road farm and shop machinery, presses, etc.  
Cost Government \$390.00

**NOW \$22.50**



We carry the World's largest Supply of New Hydraulic Equipment featuring over 20,000 Cylinders in 61 sizes and types. Can also supply all accessories, such as Pumps, fittings, Valves, Tanks, Hose Fittings. Let us solve your Hydraulic Problems. Write for information.

### VICKERS HYDRAULIC TRANSMISSION

Self contained, 2 H.P. constant torque at all speeds with variable volume reversible piston pump (controlled by outside lever) supplying piston hydraulic motor. Automatic pressure, dash pot for smooth control. Power output R.P.M.O. to 1/3 input R.P.M. 1800 continuous 4000 intermittent. Dash pot can be removed for greater R.P.M. Ideal for Lathes, Duplicator Setup on Mills, Conveyors, Small Cars, Drives, Gearing, Etc.



**COST GOVERNMENT APPROXIMATELY \$400.00. You'll Chortle when you get it for ONLY \$27.50**  
Universal Joints, Gear Trains, Power Take-offs, Drives for hundreds of adaptations also available.

### TOOL RIVET GUNS

10,000 in various makes, size, and types consisting of Drills, Rivet Guns, Nut Runners, Screw drivers, Squeezers & Motors in Cleco, Aro, Ingersoll Rand, Chicago Pneumatic, etc. Write for complete list & prices today.

**SPECIAL**  
Air Drill or Air Motor with 1/4" Jacobs chuck.

### JUST PURCHASED from WAR ASSETS ADMINISTRATION

(Aircraft Division) OVER 800,000 LBS of small hardware consisting of Fibre Lock & Elastic Strap Nuts, Needle, Ball & Roller Bearings, Machine Belts & Screws, Rivets, Pulleys, Hinge stock, Aluminum Angle & Sheet and much more. PRICE TO MOVE FAST!!! Write for list today.

### PALLEY SUPPLY COMPANY

6321 SAN FERNANDO RD.  
Dept. MTB-2  
GLENDALE 1, CALIFORNIA

Order from this Ad. All sales final. All Prices F.O.B. Glendale. Pay by M.O. or Check. P.O.'s Accepted from D & B firms. 1/2 deposit with C.O.D.'s.

## P & W to Handle Sales of Steinle Centerless Thread Rolling Machines

It has been announced that, effective immediately, the Pratt & Whitney Division of Niles-Bement-Pond Co., West Hartford, Conn., through its national selling organization will handle the sales of Steinle Centerless Thread Rolling Machines. The addition of this line of precision thread and form rolling machines adheres strictly to the Pratt & Whitney policy of representing only those companies who maintain the same high standard in product and business reputation as it does itself.

Steinle Centerless Thread Rolling Machines are available in two sizes to cover a range from No. 8 to 4" diameter, and are capable of rolling repetitively to an accuracy of .0002" on the pitch diameter with a surface finish of 3 micro inches. Steinle Machines are being used to produce American National Form, A.N.P.T., Acme, Whitworth and Metric Threads on a wide variety of hollow, solid and irregularly shaped work including studs, bolts, etc.

FIRST CLASS  
PERMIT NO. 272  
SEC. 34.9, P. L. & R.  
WHEATON, ILLINOIS

**BUSINESS REPLY CARD**  
NO POSTAGE NECESSARY IF MAILED IN THE U.S.A.

2c POSTAGE WILL BE PAID BY

**MACHINE and TOOL BLUE BOOK**

READERS' SERVICE DIVISION

WHEATON, ILLINOIS

FIRST CLASS  
PERMIT NO. 272  
SEC. 34.9, P. L. & R.  
WHEATON, ILLINOIS

**BUSINESS REPLY CARD**  
NO POSTAGE NECESSARY IF MAILED IN THE U.S.A.

2c POSTAGE WILL BE PAID BY

**MACHINE and TOOL BLUE BOOK**

READERS' SERVICE DIVISION

WHEATON, ILLINOIS



USE THESE HANDY CARDS TODAY

## MACHINE and TOOL BLUE BOOK

READERS' SERVICE DIVISION  
WHEATON, ILLINOIS

FEBRUARY, 1951

Please send FREE LITERATURE indicated by numbers circled below:

1	11	21	31	41	51
2	12	22	32	42	52
3	13	23	33	43	53
4	14	24	34	44	54
5	15	25	35	45	55
6	16	26	36	46	56
7	17	27	37	47	57
8	18	28	38	48	58
9	19	29	39	49	59
10	20	30	40	50	60

Name..... Position.....  
Company.....  
Street.....  
City..... Zone..... State.....

## MACHINE and TOOL BLUE BOOK

READERS' SERVICE DIVISION  
WHEATON, ILLINOIS

FEBRUARY, 1951

Please send information on NEW PRODUCTS described on the following pages:

.....  
.....

Please send data on the items ADVERTISED on the following pages:

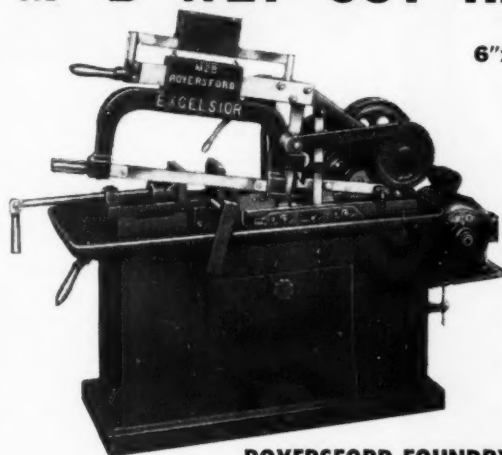
.....  
.....

Name..... Position.....  
Company.....  
Street.....  
City..... Zone..... State.....



# M<sup>2</sup>B WET CUT HACK SAW

**6"x6" CAPACITY**



Occupying a floor space of only 21"x54" the M2B Hack Saw provides an efficient, low cost cutting operation. Blade lifts automatically on return stroke. Motor driven . . . V-Belt drive. 3 Speeds. Gravity feed. Swivel vise, cutting to an angle of 45°, is interchangeable. Coolant pump operated by cam and mounted on inside of base. Here's a Hack Saw which will reduce your costs and increase production . . . send for full details today.

**ROYERSFORD FOUNDRY & MACHINE CO., INC.**  
BOX B ROYERSFORD, PENNSYLVANIA

## MIRROR FINISHES

*on dies, tools, molds and parts IN MINUTES instead of hours!*

**Star-Dust**  
**Laboratory-Graded**  
**PURE DIAMOND**  
**LAPPING**  
**COMPOUNDS**  
**and**  
**DIAMOND POWDERS**

Most accurately graded abrasive ever produced. Saves over 75% in labor and time. In all grit sizes as fine as .0001". Available in ophthalmic-tipped tubes or in new applicator gun that delivers minimum quantities to individual jobs and eliminates all waste.



**ACE**  
**ABRASIVE**  
**LABORATORIES**  
250 West 57th St.  
New York 19, N. Y.  
PLaza 7-8396

## NEW STAR-DUST DIAMOND Wheels!

**for Internal Grinding**

**SAVE YOU MONEY**  
**3-WAYS-IN-1!**

1. **Longer Life** . . . 3 or 4 times more durable than wheels of the past.
2. **Cut Faster** . . . they hold a richer content of diamond powder.
3. **More accurate** made with the world's most accurately graded diamond powders.



Available in all sizes from .046 & .090 up to 2" diam.

**"STAR**

**DUST"**

# MAKE IT EASY



## TO SEE

Mark your products in a conspicuous place clearly, legibly, uniformly.

## TO READ

Deep characters, carefully engraved, assure maximum legibility with a minimum of effort.

## TO MARK

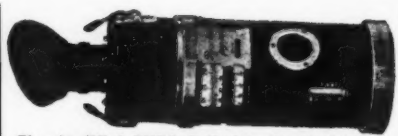
Use Matthews "Safe-Hed" Steel Stamps, with heavy supporting bevels, correctly contoured heads and easy-to-grip features.

SEND TODAY FOR BULLETIN 104-A

**JAS. H. MATTHEWS & CO.**  
3946 FORBES ST., PITTSBURGH 13, PA.



New York • Chicago • Boston • Philadelphia  
Syracuse • Newark • Los Angeles • Dallas  
Cincinnati • Cleveland • Birmingham • Gary

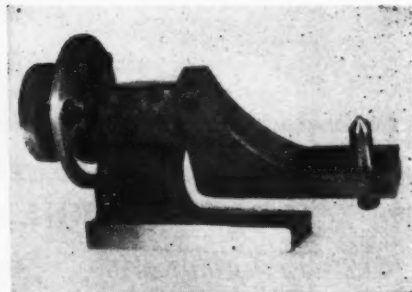


The simplified PYRO Optical is the ideal instrument for direct temperature readings of ANY heated object in your plant. Completely SELF-CONTAINED, PORTABLE, RUGGED, LIGHT WEIGHT (3½ lbs.) and FOOL PROOF. No correction charts, no accessories and no maintenance expenses. Unique design permits temperature determination even on MINUTE SPOTS. Fast MOVING OBJECTS and of the SMALLEST STREAMS.

Write for Catalog No. 30  
**THE PYROMETER INSTRUMENT CO.**  
New Plant and Lab., Bergenfield 3, N. J.

## "Mighty Midget" Radius Dressers

Sperman Metal Specialties, 2199 E. 21st St., Brooklyn 29, N.Y., announces its new, improved "Mighty Midget" Radius Dressers. The capacity of these tools has now been increased 50%; they are now able



to dress radii from 1½" concave to 1½" convex. Another important improvement is the addition of accurate, adjustable, easily-set stops, so that the radius-arm can be set to stop in any position from 0° to 180°. It is stated by Sperman that

## KENNAMETAL CUTTING TOOLS

for Increased  
Productivity



**KENNAMETAL Inc LATROBE, PA.**  
CEMENTED CARBIDE TOOLS,  
BLANKS, MILLING CUTTERS

this is the first time that accurate, adjustable stops have been put on a low-cost radius dresser. The above features are now standard equipment on both the 7" and 10" wheel size radius dressers, making these tools practically foolproof when cutting the radius on a wheel, according to the manufacturer.

### W-S Small Prong Dies

A new line of small prong dies, recently introduced by Woodruff & Stokes Co., 585 Washington St., Quincy 69, Mass., is stated to produce more uniform and smoother precision threads than has been possible heretofore. Greatly increased production runs before resharpening are also realized, according to company engineers.

The W-S small prong dies are made with from 36 to 360 threads per inch, in diameters of from .250" to .016". Tolerances can be held to .0002" on the pitch diameter. All threads are accurately hobbled and lapped to produce sharp cutting edges and smooth threads. The material may be either high speed, carbon or special alloy steel to meet job requirements. W-S dies are used on Brown & Sharpe automatics, Swiss type, and hand-operated screw machines.



**the Quality Line**

- WOODRUFF KEYS
- MACHINE KEYS
- MACHINE RACK
- TAPER PINS
- COTTER PINS
- SPECIAL PARTS

and other Stanho products  
Bulk or Packaged

WRITE for CATALOG  
and PRICES

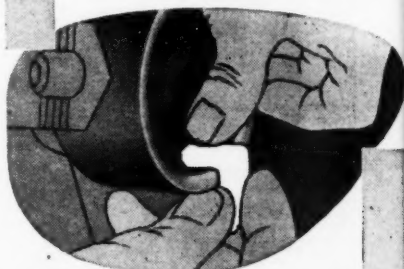
**STANDARD**  
SINCE 1872 **HORSE NAIL CORP.**  
NEW BRIGHTON PA

**"BETTER MEASURE WITH LUFKIN"**

**RADIUS MEASURING JOBS  
COMPLETED FASTER . . .  
EASIER with *LUFKIN***

**"5 application" RADIUS  
GAGES\***

*\*Pioneered by Lufkin*



Shops in every section of the country, in all types of industries, are buying the *Lufkin* advanced design "5 Application" Radius Gages because each gage permits: (1) Determining radius of inside corners or fillets, (2) Taking radius of outside corners, (3) Checking convex parts with unusual projections where radius is  $\frac{1}{4}$  or more of circle, (4) Using on concave cutter—full  $\frac{1}{2}$  or less of a circle, (5) Checking  $\frac{1}{2}$  of circumference.

Only with *Lufkin* is each gage a separate unit that can independently and more accurately be applied to the work. In addition, each blade carries the corresponding external and internal forms—the most practical combination.

Day after day, proof is piling up that American Industry is insisting, more and more, on genuine *Lufkin* precision tools.



**TAPES • RULES  
PRECISION TOOLS**  
From your  
Industrial Distributor

**THE LUFKIN RULE CO.**

**SAGINAW, MICH., New York City, Barrie, Ont.**

113A

## WHATEVER YOU NEED, YOU'LL FIND IT HERE

Compiled for quick reference and for your convenience, this handy index of products shows the pages on which you will find the items advertised in this issue. When writing to advertisers it will be appreciated if you will mention MACHINE and TOOL BLUE BOOK.

In the event you are unable to find the product or equipment you need, please write us and we'll be glad to supply the information. No obligation. Hitchcock Publishing Company, 222 East Willow Ave., Wheaton, Illinois.

- Abrasive Belt Machines, 326
- Abrasive Cloth, Paper, Disc, Belts, Wheels, Stones, Etc., 73, 92, 93, 155, 191, 286
- Adapters, 15, 236
- Air Control Equipment, 175, 215, 239
- Air Operated Equipment, 19, 20, 54, 175, 195, 215, 252, 313, 329
- Alloys, 109, 208, 209
- Angle Benders, 190, 259, 261
- Angle Dressers, 330, 333
- Angle Notchers, 37
- Angles, 311, 346
- Arbors, 256, 284
- Balancing Machines, 65, 266
- Balancing Ways, 266, 295
- Bar Machines, automatic, 112, 113
- Bearings, Ball, 352
- Bearings, Thrust, 347
- Belts, 317
- Benders, Hand, 305
- Bending Equipment, 11, 103, 190, 259, 261, 305, 324, 335
- Bevel Gears, 351
- Bits, Power, 15
- Bits, Tool, 4, 284, 361
- Blades, Work Rest, 256
- Blocks, Step, 179
- Bolts, 306, 341
- Bolts, T, 194
- Books, 213, 245, 246
- Boring Bars and Tools, 66, 68, 328, 337, 367
- Boring, Drilling & Milling Attachments, 50, 68
- Boring, Drilling & Milling Machines, 112, 113
- Boring, Drilling & Tapping Machines, 193, 333
- Boring Heads, 66, 328
- Boring Machines, 112, 113
- Boxes, Stock, 311
- Box Finger Brakes, 103
- Brackets, 263
- Brakes, Press and Bending, 11, 103, 159, 188, 320, 324
- Broaches, 123, 197, 228
- Broaching Machines, 8, 9, 197, 349
- Buffing Machines, 148, 149, 368
- Burnishing Machines, 203
- Burring Tools, 253
- Bushings, Drill Jig, 198, 234, 271, 295, 323, 332, 352
- Cable Cutters, 303, 305, 345
- Calipers, 107
- Cam Milling Service, 270, 323, 351
- Carbide Tools, 36, 123, 234, 235, 281, 354
- Carbides, 109
- Center Drills, 284
- Centers, Lathe, 253, 256
- Centers, Live, 194, 278, 279, 296, 303, 320, 329, 342, 351
- Centers, Motorized, 33
- Centering Machines, 140, 236, 261
- Chain Making Machinery, 285
- Chains and Sprockets, Back Cover
- Chamfering Tools, 273, 337
- Chasers, 222
- Checking Equipment, 295, 311, 346
- Chipping Tools, 81
- Chisels, 180
- Chucking and Indexing Fixtures, 320
- Chucking Machines, 112, 113
- Chucks, 15, 54, 64, 157, 175, 236, 283, 291
- Chucks, Air Operated, 54, 175, 291
- Chucks Automatic, 77
- Chucks Collet, 157, 293, 342
- Chucks, Drill, 77, 256
- Chucks, Lathe, 64, 236, 283, 293
- Chucks, Magnetic, 64, 327
- Chucks, Scroll, 54
- Clamps, 181, 252, 307, 325
- Clamps, Air, 252
- Clamps, "C", 325
- Clamps, Jaw, 200
- Clamps, Toggle, 181, 252
- Clinchers, 215
- Clutches, 307, 359
- Clutches, Magnetic, 327
- Collapsible Taps, 157
- Collet Tubes, 51
- Collets, 51, 157, 293, 313, 342
- Collets, Master, 3
- Comparators, Optical, 38, 203
- Contract Work, 53, 78, 124, 125, 150, 194, 270, 274, 276, 288, 323, 339, 351
- Core Drill Cutters, 256
- Counterbores, 63, 244, 256, 284, 317
- Countersinks, 230, 244, 256
- Couplings, 307
- Current Regulators, 233
- Cut-off Machines, 35, 148, 149, 207, 261, 267, 303, 305, 318
- Cutter Sharpening Machines, 8, 9, 76
- Cutters, Rod, 37, 103, 318, 319
- Cutters, Rotary, 71
- Cutting Fluid and Oils, 8, 9, 21, 269, 351
- Cutting Tools, 4, 18, 36, 71, 87, 123, 164, 165, 189, 200, 215, 227, 230, 240, 254, 284, 352, 354
- Cylinders, Hydraulic and Pneumatic, 20, 175, 215, 239, 352
- Deburring Machines and Tools, 118, 149, 230
- Demagnetizers, 61, 279, 327
- Dial Feeds, 142, 342
- Dial Indicators, 27, 38, 49, 107, 115
- Diamond Lapping Oil, 347
- Diamond Powder, 353
- Diamond Wheels, 353
- Die Filers, 312
- Die Filppers, 32
- Die Head Chasers, 322
- Die Heads, 157
- Die Making Machines, 31
- Die Millers, 275, 321
- Die Sets, 39, 91, 351
- Dies, 1, 39, 55, 63, 91, 150
- Dies, Carbide, 109
- Dies, Roller, 150
- Dies, Stamping, 94, 150
- Dividing Heads, 61, 323
- Dressing Fixtures, Grinding Wheel, 33, 200, 265, 330, 353
- Drill Chucks, 77
- Drill Heads, 83, 88, 291
- Drill Heads, Multiple Spindle, 88, 182, 226, 299, 341
- Drill Turrets, 182
- Drilling Attachments, 50, 328, 367
- Drilling Fixtures and Jigs, 53, 88, 316
- Drilling Machines, Bench, 169
- Drilling Machines, Multiple Spindle, 53
- Drilling Machines, Radial, 42, 43, 96, Inside Back Cover
- Drilling Machines, Sensitive, 169, 222, 314, 315
- Drilling Machines, Upright, 42, 43, 96, 369
- Drilling Machines, Vertical, 53, 169
- Drilling and Tapping Units, 193, 222, 244, 332
- Drills, 63, 244, 253, 352
- Drills, Electric, 40, 41
- Drills, High Speed, 63
- Drills, Twist, 87
- Drivers, Tool, 40, 41, 80, 256
- Drives, Gearshift, 223
- Drives, Motor, 312, 332
- Duplicating Machines, 101
- Dust Control Equipment, 69, 231, 291
- Dye, Layout, 288, 324, 339
- Elevators, Portable, 119, 289, 343
- Employment Placement, 229
- End Mills, 63, 87, 284
- Engineers wanted, 229
- Engravers, 179, 232, 317
- Envelopes, 323
- Etchers, 232, 279, 317
- Extension Lights, 238, 242, 292, 335
- Extractors, Tap, 309
- Eye Bolts, 151

PLACE YOUR ORDER **NOW**  
FOR

**PRESS-RITE**

OPEN BACK — INCLINABLE

**POWER  
PRESSES**

A COMPLETE PRESS LINE  
**5 TO 85 TONS**

MODEL O  
5 TON  
BENCH  
MODEL

FOR  
**BLANKING  
PUNCHING  
DRAWING  
FORMING  
STAMPING**

**PRESS-RITE POWER PRESSES** are now available in all models with reasonably prompt deliveries. Future material shortages may affect delivery schedules. Order now and have PRESS-RITE PRESSES in your plant for top production and lower operating costs. Take advantage of such PRESS-RITE features as Non-Repeat Single Stroke Safety Mechanism, Automatic Cam Actuated Brake, Greater Shut Height, and Triple Ramway Lubrication.

**WRITE TODAY** for free bulletin! You'll find that no press can match the PRESS-RITE'S many features.

NO. 85  
FLYWHEEL  
MODEL  
85 TON

ALSO AVAILABLE IN  
BACK GEARED MODELS

*Sales Service Machine Tool Co.*



2355 UNIVERSITY AVENUE  
ST. PAUL 4, MINNESOTA

- Face Plate Jaws, 64
- Facing Heads, 328, 332
- Facing Tools, 68, 157, 273, 317
- Feed Fingers, 8
- Feeds, Hopper, 316
- Feeds, Press, 52, 339, 349
- Feeders, Work, 217
- Feeler Gauge Stock, 341
- Files, 26, 71, 117, 180, 230
- Files, Escapement, 26
- Files, Needle, 26
- Files, Rotary, 71, 117, 180
- Filing Machines, 27, 29, 31, 312, 313
- Files, Oilstone, 155
- Filters, Air Line, 195, 280
- Fixture Clamps, 307
- Flame Hardening Machines, 8, 9
- Flat Stock, 78, 115, 208, 299
- Flexible Shaft Equipment, 23, 83, 143, 313
- Flexible Shaft Machines, 23, 83, 143, 313
- Floats, Welded, 257
- Fly Cutters, 240
- Forgings, 55
- Form Tools, 123, 254, 284, 333
- Furnaces, Heat Treating, 45, 187, 214, 233, 308, 325
- Gage Accessories, 27, 29
- Gage Blocks, 27, 29, 235
- Gages, 124, 125, 173, 269, 295
- Gages, Dial, 38
- Gages, Plug, 173, 269
- Gages, Snap, 124, 125
- Gang Cutters, 123
- Gang Slitters, 246
- Gear Cutting Machines, 236, 330
- Gear Hobbers, 293
- Gear Shaper Cutters, 123, 284
- Gear Shaving Machines, 75
- Gears, 75, 351
- Grinder-Millers, 143
- Grinders, Abrasive Band, 326
- Grinders, Air, Portable, 19, 280, 320
- Grinders, Bench, 40, 41, 121, 148, 149, 171, 368
- Grinders, Carbide Tool, 148, 149, 171
- Grinders, Chip Breaker, 148, 149
- Grinders, Contour, 144, 145, 312
- Grinders, Crankshaft, 79
- Grinders, Cylindrical, 60, 61, 79
- Grinders, Disc, 365
- Grinders, Drill, 31, 76, 89, 161, 339
- Grinders, Edge, 81
- Grinders, External or Internal, 277
- Grinders, Face, 250, 365
- Grinders, Face Mill, 31
- Grinders, Flexible Shaft, 143, 313
- Grinders, Jig, 203
- Grinders, Pedestal, 6, 216, 243, 368
- Grinders, Plano, 365
- Grinders, Portable Electric, 40, 41, 83, 253
- Grinders, Radial Relief, 161
- Grinders, Profile, 8, 9
- Grinders, Saw Blade, 192
- Grinders, Snagging, 24
- Grinders, Surface, 89, 121, 141, 145, 118, 149, 220, 347, 365
- Grinders, Tap, 89, 161
- Grinders, Thread, 355
- Grinders, Tool, 6, 31, 148, 149, 161, 171, 216, 263, 368
- Grinders, Template, 31
- Grinders, Tool & Cutter, 31, 89, 148, 149, 171, 216, 243, 263, 317, 368
- Grinders, Tool Post, 83
- Grinders, Tool Room, 27, 29, 144, 145
- Grinding Fixtures, 27, 29, 157, 200, 241, 263
- Grinding Service, 276
- Grinding Spindles, 10
- Grinding Wheel Forming Attachment, 200, 241
- Grinding Wheel Spindle Units, 10
- Grinding Wheels, 92, 93, 191, 220, 286
- Groove Pins, 274
- Guns, Air, 195, 313
- Hammers, Electric, 40, 41
- Hammers, Machinist, 180
- Hammers, Rawhide, 225
- Hardness Testing Equipment, 199, 273, 323
- Heads, Milling, 268
- Heads, Tap, 53, 88, 226, 315
- Hinges, 345, 347
- Hobs, 63
- Holders, Back Rest, 70
- Holders, Drill, 70
- Holders, Tool, 4, 18, 256, 343
- Hole Finishing Tools, 324
- Hole Punching Units, 176, 177, 319
- Holders, Work, 322
- Hole Location Accessories, 33
- Honing Machine, 333, 363
- Honing Tools, 363
- Hopper Feed Units, 316
- Hose Fittings, 81
- Hydraulic Equipment, 20, 175, 215, 239, 332, 352
- Indexing Machines, 255
- Indexing Tools, 291, 304, 320, 345
- Indicators, Precision, 351
- Inspection & Measuring Devices, 38, 107, 115, 124, 125, 151, 235, 269
- Jig Bore, 33, 96, 203
- Jig Boring Attachment, 68
- Jig Feet, Screw and Press Type, 179
- Jig Grinders, 33, 203
- Jigs and Fixtures, 53, 55, 311, 316, 345
- Jointers, 148, 149
- Joints Universal, 15, 313
- Keys, Woodruff, 274, 316, 355
- Keyseaters, 317, 323
- Keyway Cutting Equipment, 189, 228, 284
- Knives, Portable Electric Tool, 253
- Knives, Band, 115
- Knives, Shear, 14
- Knobs, Machine, 179, 307, 311
- Knurling Tools, 70
- Lapping Equipment & Compounds, 347, 353
- Lapping Machines, 60, 61, 286
- Laps & Tools, 279, 312
- Lathe Attachments, 82, 142, 322, 331, 367
- Lathes, Automatic, 58, 59, 65, 127
- Lathes, Bench, 44, 82
- Lathes, Chad, 42, 43
- Lathes, Cap, 277
- Lathes, Jeweler, 44
- Lathes, Precision & Toolroom, 7, 42, 43, 58, 59, 72, 82, 152, 210, 264, Inside Back Cover
- Lathes, Production, 7, 42, 43, 58, 59, 127, 132, 210, 264, 277, 333, Inside Back Cover
- Lathes, Speed, 282
- Lathes, Spinning, 318
- Lathes, Turret, 13, 65, 82
- Layout Materials, 288, 324, 339
- Lettering Machines, 185
- Lighting Equipment, 238, 242, 292, 335
- Lubricants, 260
- Lubricators, 28, 280
- Machine Parts, 274, 277, 355
- Mallets, Rawhide, 225
- Mandrels, Expanding, 257
- Mandrels, lathes, 284
- Marking Machines, 150, 185, 342
- Measuring Machines, 185
- Micrometers, 56, 57, 107
- Micromills, 230, 320
- Microscopes, 263
- Milling Cutters, 36, 43, 87, 123, 157, 164, 165, 189, 284, 320, 352
- Milling Heads, 260
- Milling Machine Attachments, 50, 68, 240, 268, 347
- Milling Machines, 8, 9, 21, 67, 90, 140, 166, 251, 287, 328
- Milling Machines, Bench, 48
- Milling Machines, Die, 275
- Milling Machines, Hand, 28, 287
- Milling Machines, Horizontal, 3, 90
- Milling Machines, Knee Type, 67
- Milling Machines, Twin, 168
- Mills, End, 63, 87, 164, 165, 284, 320
- Mills, Hollow, 157, 273, 284, 317
- Motor Drives, 312
- Motors, Electric, 22, 222
- Mounted Wheels, 92, 93, 191
- Notching Equipment, 163, 159, 176, 177, 297
- Notching Units, 297
- Numbering Machines, 351
- Nut Tapping Machines, 53
- Nuts, Flanged, 179, 306, 323
- Nuts, Self-Locking, 29
- Oil Groovers, 277, 349
- Oilstone Files, 155
- Optical Flats, 27, 29
- Optical Inspection Devices, 38, 49, 151, 218
- Panels, Wire Mesh, 272
- Pantograph Machines, 191
- Pads, Machine, 3
- Parallels, 260, 311, 346
- Partitions, 272
- Perforated Metals, 224
- Perforating Dies, 1
- Pinion Cutters, 203, 330
- Pipe Cutting Machines, 246
- Pipe Bending Machines, 335
- Planers, 40, 41
- Plates, Surface, 311, 346
- Pneumatic Tools, 19, 81, 280, 320, 332, 352
- Pointers, Drill, 31
- Points, Grinding, 92, 93, 191
- Polishing Machines, 293
- Portable Electric Tools, 40, 41, 253, 368
- Portable Elevators, 119, 289, 343
- Precision Tools, 107, 115
- Press Attachments, 46, 47, 217
- Press Brakes, 11, 103, 159, 188
- Presses, Air, 175
- Presses, Arbor, 98, 257, 349



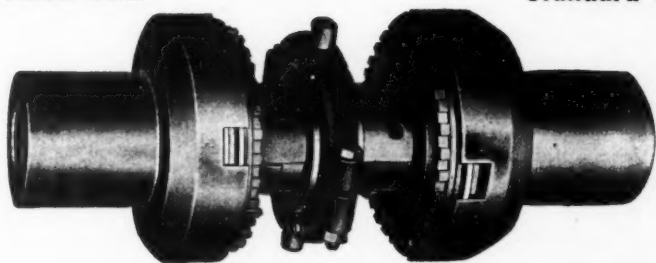
# **\$ DRAMATIC SAVING \$**

- in power costs
  - in maintenance
  - in initial expense
- with

## **CONWAY CLUTCHES**

**Precision built**

**Standard disc**



*Conway Double-Throw Clutch*

**W**hy "throw money out of the window" with out-dated, inefficient clutches! Go modern . . . just as you insist on in the rest of your equipment . . . install CONWAY CLUTCHES . . . as up-to-the-minute as 1951.

Standardized, interchangeable parts precision-built of basic materials for every industrial field.

**Write for new bulletins**

**THE CONWAY CLUTCH Co.**

1105 Marshall Ave.  
Cincinnati 25, Ohio

- Presses, Automatic, 46, 47, 248  
Presses, Deep Throat, 245, 257, 262, 309  
Presses, Drill, 40, 41, 82, 169  
Presses, Foot, 285  
Presses, Horn, 309  
Presses, Hydraulic, 46, 47, 62, 98, 175, 295, 302  
Presses, Motor Driven, 84, 85, 245, 248, 257, 262, 269, 357  
Presses, O.B.I., 84, 85, 146, 257, 269, 309, 357  
Presses, Power, 249, 257, 262, 285, 295, 357  
Presses, Punch, 163, 251, 262, 269, 302, 309, 357  
Presses, Punch, Hand, 281  
Presses, Straightening, 98, 294  
Presses, Vertical, 62  
Profiling Machines, 101, 261  
Presses, Turret Punch, 163  
Projectors, Optical, 151  
Pumps, Coolant & Lubricant, 175, 237  
Punch Press Sets, 179  
Punches and Dies, 1, 39, 55, 258, 281, 343  
Punches, Bench, 103, 342  
Pusher Tubes, 51  
Pushers, 51  
Pyrometers, 354  
Quills, 83  
Racks, 507, 311, 316  
Radius Tools, 263, 330, 333  
Rasps, 180  
Rawhide Products, 225  
Reamer Holders, 32, 70, 343  
Reamers, 63, 164, 165, 230, 244, 254, 281, 284, 361  
Recessing Tools, 256, 367  
Rectifiers, 64  
Reel Stands, 52  
Reels, 142, 285, 339, 342, 349  
Regulators, Air Line, 195, 280  
Rivet Guns, 352  
Riveting Machines, 239, 298, 314, 315, 346  
Roll Feeds, 52, 142, 251, 275, 321, 342  
Roll Forming Machines, 246  
Roll Marking Machines, 150  
Roller Dies, 94  
Routers, 83  
Sanders, 46, 41, 81, 313  
Saw Blades, Band, Inside Front Cover, 27, 29, 34, 74, 115, 263  
Saw Blades, Hack, Inside Front Cover, 115, 263, 333, 352  
Saw Frames, Hack, 263  
Saw Sharpeners, 192  
Sawing Machines, Band, Inside Front Cover, 27, 29, 74, 148, 149, 205, 343  
Sawing Machines, Circular, 40, 41, 146  
Sawing Machines, Cut-off, 35, 40, 41, 207, 267, 332  
Sawing Machines, Hack, Inside Front Cover, 35, 64, 353  
Saws, Circular, 140, 227  
Scaling Tools, 81  
Scrapers, Hand, 295  
Scrapers, Power, 295  
Screens, Perforated, 224  
Screw Drivers, Power, 81, 319  
Screw Machine Attachments, 3  
Screw Machine Products, 277  
Screw Machines, Automatic, 13, 135  
Screw Machines, Hand, 2  
Screw Machines, Swiss, 203  
Screws Cap. Set, Socket & Machine, 15, 55, 179, 196, 298, 306, 341, 352  
Segments, 94, 191, 220  
Self-Locking Nuts, 25  
Services: Milling, Grinding, Lapping, Rebuilding, Repairing, Business, etc., 194, 270, 276, 288, 323, 339, 341, 351  
Set-Up Equipment, 58, 65, 316, 345  
Shapers, 11, 42, 43, 82, 86, 148, 149, 210  
Shapers, Crank, 210  
Shavers, Gear, 22  
Shearing Machines, 11, 14, 84, 85, 103  
Shears, Portable, 40, 41  
Shears, Squaring, 14  
Shears, Throatless, 303  
Sheet Metal Machinery, 84, 85  
Shelving, 307, 311  
Shim Stock, 341  
Shims, Brazing, 346  
Shop Lights, 238, 242, 292, 335  
Sleeves, Utility, 80, 256  
Slide Forming Machines, 285  
Slitting Cutters, 284  
Slitting Machinery, 37, 246  
Sockets, 15, 256, 274  
Spacing Table Machines, 96  
Special Machinery, 65, 140, 197, 219, 311, 333  
Special Tools, 63, 253, 311, 341  
Speeders, Drill, 83  
Speed Indexers, 255  
Spindles, 10, 277  
Spotters, 295  
Sprockets, Back Cover  
Stampings, 351  
Stamps, Steel, 94, 150, 297, 342  
Steel and Steel Stock, 27, 29, 78, 104, 147, 208, 209, 213  
Step Block Sets, 179  
Straight Edges, 346  
Straighteners, Wire, 285  
Straightening Machines, 142  
Structurals, 104  
Stud Sets, 179, 323  
Stud Setters, 15, 129, 157, 179  
Studs, 306, 323, 341  
Superfinishers, 65  
Switches, Demagnetizing, 64  
Tables, Elevating, 119, 289, 343  
Tables, Rotary & Index, 323, 345  
Tachometers, 169, 279  
Tap Extractors, 300  
Tap Grinders, 76  
Tap Guide Fixtures, 322  
Tap Holders, 32, 129, 256, 343  
Tap Sharpeners, 76  
Taper Pins, 274, 306, 316, 355  
Tapes, Steel, 115  
Tappers, 42, 43, 299, 315, 332  
Tapping Attachments, 299, 315  
Tapping Heads, 129, 226, 315  
Tapping Machines, 12, 43, 42, 43, 53, 129, 192  
Taps, 16, 17, 63, 157, 284, 352  
T-Bolts, 194  
Thinners, Drill Point, 31  
Thread Milling Machines, 76  
Thread Rolling Machines, 12, 219, 337  
Threading Machines, 13, 53, 337  
Threading Tools, 124, 125  
T-Nut and Stud Sets, 179  
Tool Cribs, 272  
Tool Designing, 339  
Tool Holders, 4, 18, 256  
Tool Repair, Service & Salvage, 341  
Tools, Machinists', 115, 180, 355, 361  
Tracer Controlled Equipment, 101  
Transfer Screws, 196, 346  
Transformers, 353  
Transmissions, 352  
Traps, Air, 257  
Tube & Rod Finishing Machines, 37, 103, 261, 318, 335  
Tube Fabricating Equipment, 261  
Tube Mill Machinery, 246  
Tubing, 104  
Tubing Notchers, 297  
Turbines, Steam, 236  
Turning Machines, 58, 59  
Turning Tools, 68, 273  
Turrets, Bed, 331  
Turrets, Drill, 182  
Turrets, Lathe, 331  
Turrets, Tailstock, 331  
Type Holders, 94  
Universal Ironworker, 37  
Valves, 20, 30, 142, 175, 239, 257, 291, 313  
Variable Speed Transmissions, 27, 29  
Verniers, 304  
Vise Attachments, 290, 263  
Vises, Bench and Machine, 54, 64, 195, 196, 290, 307, 325, 328, 345, 347  
Welding Equipment & Supplies, 40, 41, 271  
Wheel Dressers, 200  
Wheel Forming Attachment, 241  
Wheels, Hand, 311  
Wire Forming Machines, 285, 324  
Wire Straightening Machines, 305  
Wire Mesh, 272  
Work Feeders, 217  
Wrenches, 15, 274

This products index is a free service to advertisers to assist our readers in quickly finding the products in which they are interested. Listed are only the products mentioned in the advertisements in this issue. It is not necessarily a complete index of all the various products manufactured by the advertisers. While every effort has been made to guard against omissions and inaccuracies, the compilers cannot be responsible for errors, which are sometimes beyond control.

*New**Surplus***REAMER SETS**

Sets A-H Critchley Type Expansion Reamers, 15/32" — 1-1/16", 8 Reamers in Wooden Box	\$17.50
Sets I-L Critchley Type Expansion Reamers, 1-1/16" — 1-25/32", 4 Reamers in Wooden Box	\$19.00
Sets 1/4" — 1-1/4" by 32nds Hand Reamers, 33 Reamers in Wooden Box	\$35.00
Sets 1/4" — 1" by 16ths Hand Expansion Reamers, 13 Reamers in Wooden Box	\$35.00

*New**Surplus***HIGH SPEED TOOL BITS**

3/16" square	x 2"	long	\$ .10 each
1/4"	" x 2-1/2"	"	.15 "
5/16"	" x 2-1/2"	"	.20 "
3/8"	" x 3"	"	.30 "
7/16"	" x 3-1/2"	"	.40 "
1/2"	" x 4"	"	.60 "
5/8"	" x 4-1/2"	"	.90 "
3/4"	" x 5"	"	1.25 "
7/8"	" x 6"	"	2.00 "
1"	" x 7"	"	2.50 "

**VICTOR MACHINERY EXCHANGE, INC.**

251 Centre Street

Phone: CA nal 6-5575

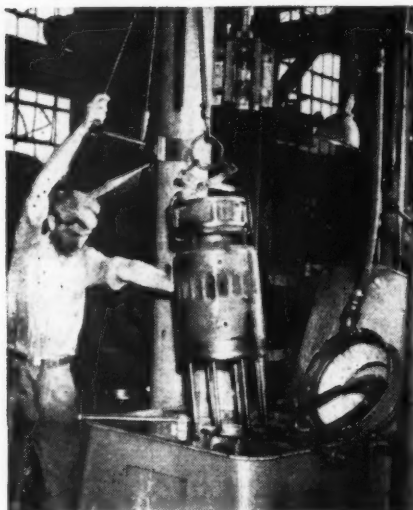
New York, N.Y.

# Index to Advertisers

Aber Engineering Works, Inc.	189	Circular Tool Company, Inc.	227
Ace Abrasive Laboratories	323	Clark Company, Robert H.	349
Ace Drill Bushing Company	323	Clemson Brothers, Inc.	263
Ace-Danneman Company, Inc.	351	Cleveland Twist Drill Company	87
Ace Industrial Company	276	Colonial Bushings, Inc.	332
Ace Tool Company	301	Columbus Die, Tool & Machine Co.	339
Ace Wire and Iron Works	272	Commander Manufacturing Company	299
Acorn Bearing Company	347	Comtor Company	269
Acromark Company	351	Consolidated Machine Tool Corp.	157
Aget-Detroit Company	291	Continental Machine Company	318
Air Way Pump and Equipment Company	313	Conway Clutch Company	359
Airtherm Manufacturing Company	188	Cook and Chick Company	316
Alina Corp.	107	Craft-Hollow Industries	288
Atlegheny Ludlum Steel Corp.	208-209	Cullman Wheel Company	Back Cover
Allen Collet Manufacturing Company, Inc.	51	Danly Machine Specialties, Inc.	91
Allied Products Corporation	55	Davis Boring Tool Division	18
Allison Chuck Products	293	(Giddings & Lewis Machine Tool Co.)	
American Air Filter Company	69	Dayton Rogers Manufacturing Company	351
American Broach and Machine Company	197	Dearborn Company, J. W.	320
American Machine and Foundry Company	77	Delaware Tool Steel Corp.	214
(Wahlstrom Division)		Delco Products	22
American Pipe Bending Machine Company	335	Delta-Rockwell Tool Division	148-149
American Tool Works Company	Inside Back Cover	Denison Engineering Company	46-47
Ames Company, B. C.	38	Detroit Power Screwdriver Company	319
Anderson Brothers Manufacturing Company	295	Detroit Stamping Company	181
Apex Machine & Tool Company	15	Di Machine Corp.	248
Armstrong-Blum Manufacturing Company	Inside Front Cover	DoAll Company	27-29
Armstrong Brothers Tool Company	4	Dreis & Krump Manufacturing Company	159
Atlantic Gear Works	351	Dremel Manufacturing Company	253
Atlantic Saw Mfg. Co.	31	duMont Corp.	228
Atlas Press Company	90	Dumore Company	83
Auto Moulding & Manufacturing Company	345	Dykem Company	288
Baldor Electric Company	171	Economy Machine Products Company	298
Barber-Colman Company	164-165	Economy Tool & Machine Company	295
Bath Company, John	16-17	Edroy Products Company	218
Behr-Manning Co.	155	Eisler Engineering Company, Inc.	270
Benchmaster Manufacturing Company	251	Electro-Mechano Company	169
Beverly Shear Manufacturing Company	303	Elgin Tool Works	72
Billings & Spencer Company	274	Empire Tool Company	32
Black Drill Company	244	Enco Manufacturing Company	331
Blair Tool and Machine Corp.	351	Erickson Tools Division	255
Blake Company, Edward	76	Excelsior Tool & Machine Co.	190
Blanchard Machine Company	220	Falls Products Company	351
Bliss Company, E. W.	245	Federal Foundry Supply Company	345
Bloomfield Tool Corp.	323	Fosterla Pressed Steel Corp.	238
Blum & Company, Inc., Julius	259	Fulflo Specialties Company	39
Brown Corp., W. R.	195	Fulmer Company, C. Allen	363
Brown Engineering Company	307	G & S Machine Shop	320
Brown & Sharpe Manufacturing Company	56-57	Galland-Henning Manufacturing Company	20
Buffalo Forge Company	37	Gallmeyer & Livingston Company	86
Burke Machine Tool Company	328	General Engineering & Manufacturing Company	317
Burr Company, John T.	317	Genesee Manufacturing Company	317
Busch Company, J. C.	316	Giddings & Lewis Machine Tool Company	18
Caluwaerts Company, Inc., R.	71	(Davis Boring Tool Division)	
Carborundum Company	73	Gillen Company, John	274
Cardinal Machine Company	345	Gilman, Russell T.	203
Carpenter Steel Company	213	Gisholt Machine Company	65
Carroll and Jamieson Machine Tool Company	333	Glenzer Company, J. C.	80
Chandler Tool Company	328	Gorton Machine Company, George	101
Chicago Dial Indicator Company	49	Grant Manufacturing & Machine Co.	298
Chicago Die Casting Manufacturing Company	242	Green Instrument Company	179
Chicago Rawhide Manufacturing Company	225	Greener Arbor Press Company	319
Chicago Screw Company	306	Greenlee Tool Company	305
Chicago Tool & Engineering Company	323	Grinders & Fixtures, Inc.	304
Chicago Wheel & Manufacturing Company	92-93	Grob Brothers	26
Cimcool Division	21	Grobet File Company of America	342
(Cincinnati Milling Machine Co.)		Hall Manufacturing Company	119
Cincinnati Bickford Tool Company	96	Hamilton Tool Company	6
Cincinnati Electrical Tool Company	348	Hammond Machinery Builders	239
Cincinnati Lathe and Tool Company	7	Hanna Engineering Works	3
Cincinnati Milling Machine Company	8-9	Hardinge Brothers, Inc.	224
Cincinnati Milling Products Division	21	Harrington & King Perforating Company	219
(Cincinnati Milling Machine Company)		Hartford Special Machinery Co.	196
Cincinnati Shaper Company	11	Hartmann Manufacturing Company	346

# *Now!* MAKE **ONE SOURCE**

**RESPONSIBLE FOR YOUR HONING RESULTS**



## **FULMER SUPPLIES**

### **HONING MACHINES**

Fourteen models cover diameters from 1/4" to 30". Strokes to 84".

### **HONING TOOLS**

Alexander Ball Tools available in sizes to 50".

### **HONING FIXTURES**

Why divide responsibility for the performance of your honing operations among several suppliers? Fulmer supplies a *complete honing package* — honing machine, tools and necessary fixtures—giving the user *one source* that *guarantees* best honing results!

Fulmer Honing Machines are engineered to give maximum production with minimum investment. They are known for rapid stock

removal and extreme accuracy. Quick change over for various size jobs. The machines are simple to operate—easy to set up—many users have unskilled labor operating them efficiently.

Save on production time, cut costs and improve quality on finishing all classes of cylindrical bores with a *Fulmer Honing Package*—it offers the *greatest value* in the honing field. Write for Bulletin No. 10 and full details.

**C. ALLEN FULMER CO.** 1242 FIRST NATIONAL BANK BLDG.,  
CINCINNATI 2, OHIO

Heller Brothers Company	186	Nicholson & Company, W. H.	257
Hendey Machine Company	210	Nicholson File Company	117
Herzberg Corp.	88	Nielsen, Incorporated	343
Heuser Manufacturing Company	316	Nielsen Tool and Die Company	136
Hevl Duty Electric Company	233	Nilson Machine Company, A. H.	285
High Speed Hammer Company	314-315	Norgren Company, C. A.	28
Hoggson & Pettis Manufacturing Company	297	Northwestern Tool & Engineering Company	179
Howe & Fant, Inc.	182	Norton Company	69-61-286
Humm Safety Equipment Company, John	349	Oliver Instrument Company	31
Huppert Company, K. H.	325	Oliver Machinery Company	318
HyPneumat, Inc.	332	O'Neil-Irwin Manufacturing Company	103
Ideal Industries, Inc.	279	Ottmiller Company, Wm. H.	311
Industrial Products Suppliers	341	Palley Supply Company	352
J & S Tool Company	206	Pannier Corp.	94
Jacobs Manufacturing Company	283	Parker Stamp Works, Inc.	159
Jefferson Engineering and Manufacturing Co.	313	Perkins Machine Company	215
Johnson Gas Appliance Company	308	Piners Engineering Company	261
Junkin Safety Appliance Company	366	Pittsburgh Tool Steel Wire Company	78
Kalamazoo Tank and Silo Company	205	Pivot Punch and Die Corp.	258
Kearney and Trecker Corp.	67	Plunket Machine Company, J. E.	347
Kennametal, Inc.	336	Pope Machinery Corporation	10
Kent-Owens Machine Company	287	Potter & Johnston Company	135
King, Andrew	323	Pratt & Whitney	241
L-W Chuck Company	64	Precise Products Company	143
LaPeer Manufacturing Company	252	Preis Engraving Machine Company, H. P.	317
Lassy Tool Company	322	Procon Safety Chuck Company	129
Lee Company, K. O.	243	Product Machine Company	39
Lees-Bradner Machine Company	337	Prutton Machine & Tool Company, D. H.	12
Lempe Products, Inc.	79	Pyrometer Instrument Company	336
Leslie Welding Company	281	Quality Chaser Company	322
Levin & Son, Louis	44	Queen City Machine Tool Company	216
Leuthwaite Machine Company, T. H.	342	R and I Tools	70
Lima Electric Motor Company	223	Racine Tool and Machine Company	35
Linley Brothers Company	346	Reading Machine Company	323
Littell Machine Company, F. J.	142	Ready Tool Company	303
Logansport Machine Company	175	Redner Air Device Corp.	291
Lorejoy Tool Company	36	Reed Roller Bit Company	81
Lufkin Rule Company	355	(Cleo Division)	
M. B. Products Company	286	Reich Manufacturing Company, J. R.	351
M & N Machine Tool Works, Inc.	362	Reld Brothers Company, Inc.	349
McDonough Manufacturing Company	339	Reltool Corp.	284
Machine Products Corp.	311	Revere Fisher Engineering Company	198
Madison-Kipp Corporation	329	Rice Pump and Machine Company	312
Madison Manufacturing Company	66	Richards Company, J. A.	324
Maquoketa Company	267	Rivett Lathe & Grinders, Inc.	313
Marshalltown Manufacturing Company	269	Rocheleau Tool and Die Company	263
Marvel Tool and Machine Company	329	Rockford Machine Tool Company	152
Matthews & Company, James H.	326	Rodgers Hydraulic, Inc.	62
Mattison Machine Works	365	Rogers and Company, Samuel C.	256
Maxwell Company	367	Roll Feeds Corporation	275-321
Mead Specialties Company	217	Root Company, B. M.	313
Mettler Machine Tool Company, Inc.	365	Rotor Tool Company	19
Meyers Company, W. F.	234	Rouse Company, H. B.	48
Michigan Chrome & Chemical Company	339	Royal Oak Tool and Machine Company	161
Michigan Drill Head Company	341	Royal Products	326
Midwest Tool & Engineering Company	343	Roxersford Foundry & Machine Co.	323
Modern Tool Works	157	Ruleta Co.	339
Moline Tool Company	333	Rusnok Tool Works	50
Monarch Machine Tool Company	58-59	Ruthman Machinery Company	239
Montgomery and Company	289	Rutland Tool Service	341
Moore Special Tool Company	33	Ryerson & Son, Inc., Joseph T.	104
Morton Machine Works	307	S & S Hinge & Metal Products Company	347
Motch & Merryweather Machinery Co., The	146	S & S Machine Works	342
Motor Tool Manufacturing Company	278	Sales Service Machine Tool Company	357
Mummet-Dixon Company	332	Sanford Manufacturing Company	121
National Automatic Tool Company	193	Schaffer Company, S. S.	151
National Broach and Machine Company	75	Schauer Manufacturing Corp.	282
National Machine Tool Company	290	Scherr Company, Inc., Geo.	151
National Tool Company	123	Schmidt, Inc., George T.	185
Nebel Machine Tool Company	277	Schultz and Anderson Company	257
Noise, Karl A.	304	Scientists' and Engineers' Association	229
New Britain Gridley Machine Division	112-113	Scully-Jones and Company	256
New Hermes, Inc.	232	Seneca Falls Machine Company	127
New Method Steel Stamps, Inc.	342	Sentry Company	45
Newage International Inc.	273	Service Machine Company	309
Newfield Machined Parts Company	240	Severance Tool Industries	230
Niagara Machine & Tool Works	84-85	Sheffield Corp.	124-125
Nichols Engineering Company	312	Sheldon Machine Company	264
Nichols-Morris Corporation	166	Sid Tool Company	333



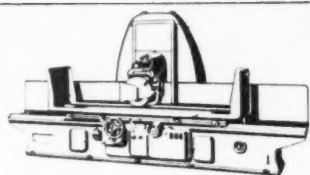
# MATTISON GRINDERS

*If it's a Flat Surface to Grind  
There's a Mattison to Grind it.*

● With the addition of the production grinding machinery formerly made by the Hanchett Manufacturing Company, Mattison now is in a position to work with you on all your surface, face and disc grinding problems. These machines are made in various types to handle a wide range of work. Experienced fixture engineers are available to give you best production efficiency with Mattison Machines.

For any flat grinding, ask for our recommendations on the proper method and machine for your job. No obligation, of course.

For catalog on all machines, ask for free copy of general bulletin.



Precision Surface Grinders  
Horizontal Spindle



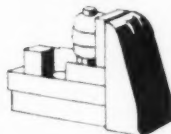
Disc Grinders,  
Double Spindle Type



Vertical Spindle  
Disc Grinders



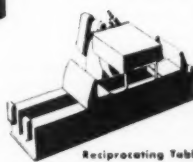
Plane Grinders,  
Rotary Table Type



Rotary Table  
Surface Grinders



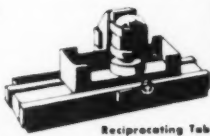
Automatic Rotary  
Surface Grinders



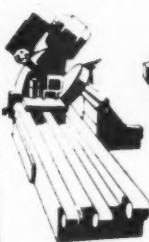
Reciprocating Table  
Face Grinders



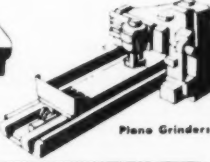
Disc Grinders,  
Single Spindle Type



Reciprocating Table  
Surface Grinders  
Vertical Spindle



Face Grinders,  
Traveling Wheel



Plane Grinders

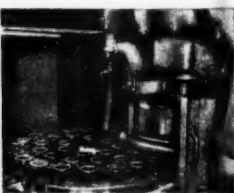
**MATTISON**

**MACHINE WORKS**

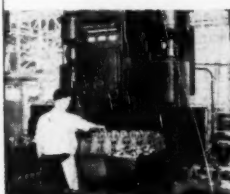
ROCKFORD • ILLINOIS



40 hours before — max. 4 hours. Pump case ground on Mattison Horizontal Spindle Precision Surface Grinder



120 surfaces of cast iron compression heads per hour, removing 1/32" stock with Mattison No. 24 Rotary Surface Grinder



900 connecting rods per hour, using 40 station fixture to finish grind crank and wrist pin end of assembled rod with Mattison No. 72 Grinder



Shown variety of work run on Mattison Face Grinders



Here's protection against those forgetful moments when tragedy lashes out to claim its toll.

The Junkin Safety Guard is effective . . . dependable. It can't "forget" because it's built in . . . actually becomes a part of the press itself.

That's how Junkin is helping thousands of satisfied users set up better safety records . . . higher production records.

### Write For This New Bulletin

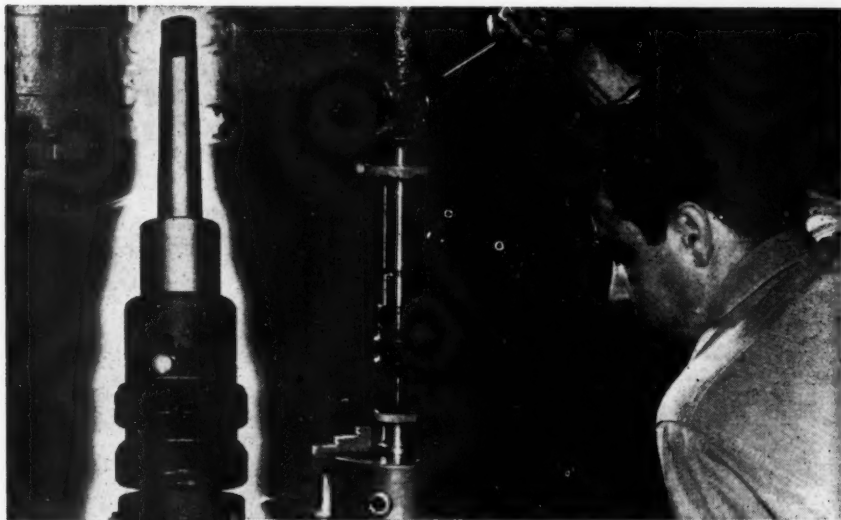
If you would like the facts about Junkin Safety Guards, write. There's no obligation.



## JUNKIN SAFETY GUARD

JUNKIN SAFETY APPLIANCE CO., INC.  
930 W. HILL ST. LOUISVILLE, KENTUCKY

Simonds Abrasive Company	121
Simonds Saw and Steel Company	14
Simonski, Gilbert S.	187
Skillsaw, Inc.	40-41
Skinner Chuck Company	54
Snow Manufacturing Company	53
South Bend Lathe Works	82
Sperman Metal Specialties	339
Stadoll Manufacturing Company	347
Standard Gage Company	173
Standard Horse Nail Corp.	337
Standard Pressed Steel Co.	25
Standard Steel Specialty Company	316
Standard Tool Company	83
Standard Transmission Equipment Company	332
Staples Tool Company	254
Starrett Company, L. S., The	115
Steel Sales Corp.	346
Sterling Factory Equipment Company	311
Stone Machinery Company	207
Stuart Oil Company, D. A.	260
Sundstrand Machine Tool Company	266
Tamms Industries Inc.	324
Tannewitz Works	74
Taylor Dynamometer & Machine Company	222
Tomkins-Johnson Company	215
Thompson Grinder Company	144-145
Thriftmaster Products Corp.	215
Tietzman Tool Corp.	323
Torit Manufacturing Company	231
Tree Tool and Die Works	68
Treichler, L. F.	194
Troyce Manufacturing Company	323-345
Twentieth Century Mfg. Company	292
U. S. Drill Head Company	226
U. S. Electrical Tool Company	24
U. S. Steel Supply Company	147
Universal Engineering Company	271
Universal Form Tool Company	333
V & O Press Company	249
Vascoloy-Ramet Corp.	109
Veet Manufacturing Company	268
Verson Allsteel Press Company	146
Victor Machinery Exchange	361
Vimeo Manufacturing Company	335
Vogel Tool & Die Corporation	297
Wade Instrument Company	323
Wade Tool Company	2
Wales-Strippit Corp.	176-177
Walker Company, O. S.	327
Walls Sales Corporation	326
Waltham Machine Works	330
Walton Company	300
Wardwell Manufacturing Company	192
Warner & Swasey Company	13
Watts Bros. Tool Works	324
Webber Gage Company	235
West, Jas. W.	351
West Point Manufacturing Company	194
Western Machine Tool Works	42-43
Whistler and Sons, S. B.	1
White Dental Manufacturing Co., S.S.	23
Whitney Metal Tool Company	262
Whiton Machine Company	236
Wicaco Machine Corp.	277
Wiedeman Machine Co.	163
Willey's Carbide Tool Company	281
Wilson, K. B.	98
Wilson Mechanical Instrument Company	199
Wilton Tool Manufacturing Company	325
Wirth and Son, Carl, Inc.	273
Wittek Manufacturing Company	52
Woodson Tool Company	320
Yoder Company	246
Yost Manufacturing Company	328
Ziegler Tool Company, Wm.	343



## One RECESSING TOOL... Any RECESSING JOB!

● Cut Recessing Costs on your Drill Press... Boring Mill... Turret Lathe... Radial Drill... etc. **ALL NEW Series "R" Maxwell Recessing Tools** give unlimited versatility.

**SIX** sizes are stocked for immediate shipment. Shanks to fit your machines are instantly interchangeable. Capable of taking cuts at extremely high rates of feed, the new Maxwell tools feature a micro-adjusting collar which facilitates rapid and accurate diameter control to within 0.001-inch or 0.050-inch per tool revolution. Cutters can be supplied to make single or multiple recessing in a single operation.

Cut location made from either top or bottom surfaces. Ball-bearing pilot facilitates use of Series "R" Recessing Tools with existing fixtures. Without fixtures, ball-bearing pilots will stop on workpiece surface to accurately locate cutter.

Hardened tool-steel wearing surfaces guarantee maximum tool life. Cutting action is smooth and requires only finger-tip feed pressure. Series "R" Recessing tools are regularly furnished having cutter ratio of either 1:3 or 1:1. Hole in tool block permits flow of coolant or lubricant to cutter.

Standard Series "R" Recessing Tools are available to cut recesses from 1/4 to 4 1/4 inches in diameter. Write today for catalog "R" ....



Precision boring with **MAS-TUR** heads is described in catalog PBH. These inexpensive tools feature large capacity, adjustability and accuracy. Specifications are charted.



Production Boring with the **E-Z** set line of Boring heads is subject of catalog No. 30. Complete line of tools is shown. Prices, capacities and specifications are charted for reference.



# THE MAXWELL COMPANY

221 BROADWAY

BEDFORD, OHIO

# A REAL GRINDER

*and a*  
**REAL  
BARGAIN**

**PEDESTAL TYPE \$171.00**

**BENCH TYPE \$132.00**

- Full 1 H.P. Motor
- Two 10" x 1" Grinding Wheels
- Exhaust Outlets on Wheel Guards
- All Angle Tool Rests
- Fabricated Steel Pedestal
- 20" Between Wheels
- Ball Bearing Construction



**WRITE** for name of nearest distributor or Bulletin 30 AB

**MFRS. OF DRILLS, GRINDERS, BUFFERS AND PORTABLE TOOLS**

TRADE

*The Cincinnati*

MARK

**THE CINCINNATI ELECTRICAL TOOL CO.**

Division of THE R. K. LeBLOND MACHINE TOOL CO.

**CINCINNATI 8, OHIO, U. S. A.**

# A GOOD SPINDLE

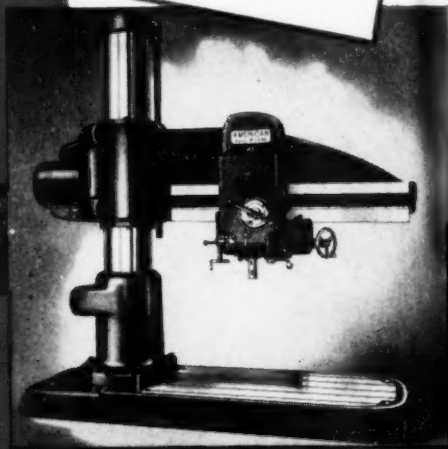
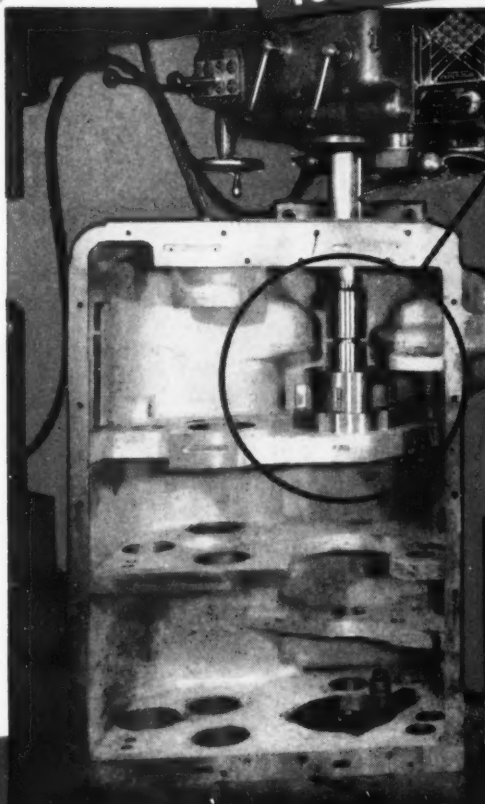
FOR GOOD BORING AND TAPPING . . .

Here's a 10" tapping job  
on a 5-foot "AMERICAN"  
Hole Wizard Radial

It takes a sturdy, rigid machine with  
plenty of power to do work like  
this. Especially does it require a  
rigid and smooth-acting spindle.

And that's exactly what "AMERICAN"  
Hole Wizards are noted for.  
Power—rigidity—convenience and  
ease of control are "AMERICAN"  
attributes that cut drilling, tapping  
and boring costs wherever they are  
put on the job.

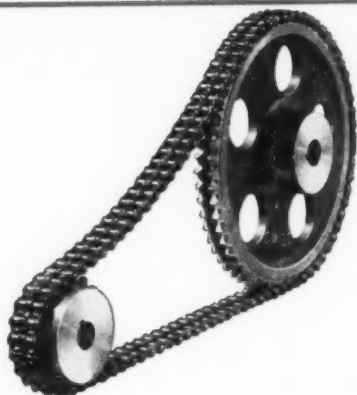
Bulletin No. 327 tells all about  
them. Want one?



THE AMERICAN TOOL WORKS CO.

Cincinnati, Ohio U.S.A.

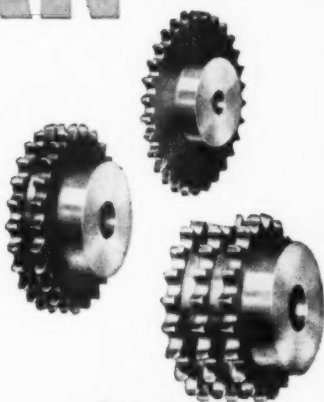
*Lathes and Radial Drills*



# CULLMAN SPROCKETS

**Over 80,000 Sprockets and  
80,000 feet of Chain now in stock.**

There are important advantages in bringing your sprocket requirements to Cullman Wheel. Chief among these is the fact that in fifty-five years of specialization in the design and manufacture of sprockets and kindred power transmission parts, has built up the amazing total of over eighty thousand sprockets in stock. Invariably your requirements can be met quickly from this great sprocket and chain inventory. This always brings the cost down. Quick delivery is also available at Cullman on special made to order sprockets. Send your blue prints for recommendations and estimates.



*Be sure to write for our Cullman Sprocket Catalog*



**TODAY**

**CULLMAN WHEEL COMPANY**

109-S

1350 W. ALTGELD STREET • CHICAGO 14, ILLINOIS